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Master's thesis, Strategic Finance and Analytics

**THE IMPACT OF CORPORATE SOCIAL RESPONSIBILITY ON THE PERFORMANCE OF
EUROPEAN COMPANIES**

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Author: Sami Kalliomäki

1st Examiner: Associate Professor Sheraz Ahmed

2nd Examiner: Professor Eero Pätäri

ABSTRACT

Author: Sami Kalliomäki
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Supervisors: Associate Professor Sheraz Ahmed
Professor Eero Pätäri
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Companies' internal governance practices and the impact of companies on the environment, societies, and other external stakeholders have raised much discussion in the 21st century. The relevance of corporate social responsibility (CSR) has grown among companies as several benefits are recognized in utilizing CSR. Environmental, governance and social (ESG) factors can be seen as a metric for how the stakeholders view the company or to describe the company's ability to operate non-financially. Numerous studies have been published to study the relationship between corporate social responsibility and financial performance. The topic still is relatively new as a trend, and there seems to be space for further studies.

Inspired by the importance of social responsibility, this thesis aims to study the relation between corporate social responsibility and corporate financial performance in European companies. More specifically, this paper conducts panel data regression models to find correlations between environmental, social, and governance (ESG) performance and financial key figures. Fixed effects and random effects regression models are used in the empirical analysis. Key figures in this research are return on equity (ROE), return on assets (ROA), Tobin's Q, and cost of debt. All the financial and ESG data are collected from the Refinitiv Eikon database.

The results suggest that corporate social responsibility performance positively influences profitability through ROA and ROE, but the impact is more substantial to ROA. There is clear evidence that investors are interested in responsible companies, and companies focusing on ESG issues receive higher valuations. Furthermore, a weak CSR performance leads to lower valuations and profitability through ROA. The negative impact of CSR on valuation is relatively higher in irresponsible companies compared to the positive impact in responsible companies. On the other hand, a higher CSR performance influences other key metrics more significantly than lower CSR performance. Based on the results, a high ESG performance leads to significantly lower interest, but ESG score does not impact cost of debt in other models. A contradictory result is that the governance pillar score shows a slightly negative influence on ROA. Additionally, there is no evidence that the impact of CSR performance has grown over the years or that the impact differs in different years.

TIIVISTELMÄ

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Yritysten sisäiset hallintakäytännöt ja yritysten liiketoimintojen vaikutus ympäristöön, yhteisöihin ja muihin ulkoisiin sidosryhmiin ovat aiheuttaneet paljon keskustelua 2000-luvulla. Yhteiskuntavastuun merkitys on kasvanut ja yritykset huomioivat vastuullisuutta liiketoiminnassaan entistä enemmän, sillä esille on nostettu paljon hyötyjä yritysten panostaessa vastuullisuuteen. Ympäristölliset, sosiaaliset ja hallinnolliset tekijät voidaan nähdä mittarina siihen, kuinka sidosryhmät näkevät yrityksen, tai kuinka yritys suoriutuu muilla kuin taloudellisilla mittareilla. Yhteiskuntavastuun vaikutuksesta yritysten taloudelliseen suoriutumiseen on tehty useita tutkimuksia. Ilmiönä aihe on kuitenkin suhteellisen uusi ja vaikuttaisi olevan vielä tilaa uusille tutkimuksille aiheesta.

Vastuullisuuden tärkeydestä inspiroituneena, tämän tutkielman tarkoituksena on löytää ja tutkia yhteyksiä yritysten vastuullisuuden ja taloudellisen suoriutumisen välille. Tähän tarkoitukseen tutkielmassa rakennetaan regressiomallit käyttäen paneelidataa. Paneelidataregressioissa hyödynnetään kiinteän ja satunnaisten vaikutusten mallia. Empiirisissä tuloksissa tulkitaan ESG pisteiden ja taloudellisten avainmittarien välistä suhdetta. Taloudelliset avainmittarit ovat pääoman tuotto prosentti (ROE), kokonaispääoman tuotto prosentti (ROA), Tobinin Q, ja velan kustannus. Talous- ja vastuullisuusdata ovat kerätty Refinitiv Eikon tietokannasta.

Tuloksissa ilmenee, että yhteiskuntavastuullisuus vaikuttaa positiivisesti kannattavuuteen ROE:n ja ROA:n kautta, mutta vahvemmin ROA:n kautta. Tulokset osoittavat selvästi, että sijoittajat ovat kiinnostuneita vastuullisista yrityksistä ja yritykset keskittymällä ESG-ongelmiin saavat korkeampia arvostuksia. Vastaavasti heikko yhteiskuntavastuullisuus johtaa matalampiin arvostuksiin ja kokonaispääoman tuottoihin. Yhteiskuntavastuullisuuden negatiivinen vaikutus arvostukseen epävastuullisissa yrityksissä on suhteellisesti isompi verrattuna positiiviseen vaikutukseen vastuullisissa yrityksissä. Toisaalta vastuullisten yritysten ja muiden avainmittarien välillä on enemmän merkittäviä yhteyksiä verrattuna epävastuullisten yritysten yhteyksiin. Tulosten perusteella parempi ESG-suoriutuminen johtaa matalampaan velan kustannukseen, mutta muilla malleilla ESG ei vaikuta velan kustannukseen. Ristiriitainen tulos on se, että yritysten hallintotapaa kuvaavalla mittarilla on lievä negatiivinen vaikutus kokonaispääoman tuottoon. Tuloksissa ei myöskään löytynyt todisteita, että yhteiskuntavastuun vaikutus olisi kasvanut vuosien aikana, tai että vaikutus olisi riippuvainen vuodesta.

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1. Introduction

The sustainable trend is very apparent in the modern world. Actions have been made to prevent climate change and shift more activities towards sustainable development and renewable energy. Consumers are also voting with their wallets. For example, customers increasingly use environmentally friendly products and avoid companies that do not care for the environment. In addition, investors also utilize sustainability and responsibility measures in their investment analyses. They focus not only on the bottom line but also on companies they invest in to impact societies and the environment positively. (Whelan and Kronthal-Sacco, 2019; Diversyfund, 2021)

Socially responsible investing (SRI) and ESG investing have had different forms. In the 1960s, the issues of SRI concerned, for example, civil rights, antiwar, and environmental movements. In the mid-2000s, ESG investing emerged. Today, SRI is more referred to as ESG investing. ESG stands for *environmental*, *social*, and *governance*. ESG measures, for example, how well a company is prepared to operate in a world with climate issues, more strict regulations, more population, and limited resources. More data and robust tools are available today, making investing and transparency of companies using ESG metrics more convenient and relevant for investors and other stakeholders. (Townsend, 2020, 1–2)

Poor corporate governance has had a significant impact on the growth of ESG awareness. For example, bad ethical behavior and poor corporate management, among other reasons, have been behind crises like the subprime crisis. The crisis has been fatal to many stakeholders. Such corporate governance is the opposite of what ESG investors and other stakeholders seek in the governance factor. In addition to poor governance, environmental issues and especially climate change have impacted the growth of ESG during the 21st century. Awareness of environmental issues has grown substantially, and it is a topic that has been and is extensively discussed. (Townsend, 2020, 6, 9–10) In an interview between Sara Bernow, Robin Nuttall, and Sean Brown by McKinsey & Company (2020), Nuttall says that how well a company manages ESG issues is an indicator of how external stakeholders, for example, regulators, governments, and investors, perceive its business and operations.

The world's temperature will be a significant issue regarding the health of the human population if the current trend continues. According to estimates of economic models, if the current greenhouse gas emissions trend continues, the temperature will rise 3.7°C yearly by average in the late 21st century. In addition, the sea level will rise 63cm by the end of the 21st century. The economic losses caused by global warming are estimated to be 5% GDP per year now and forever if no actions are made. Taking into account more risks and impacts, the gross domestic product can shrink even by 20%. (Stern, 2006, 6; Yoshino, Taghizadeh-Hesary, Sachs, and Woo, 2019, 30)

Actions have been made and are planned to answer the environmental issues. One of the known ones, for example, is The Paris Agreement signed by the countries in the United Nations (2015). One of the agreement's targets is to slow climate change by keeping the increase of the global temperature below 2 degrees Celsius above pre-industrial levels and striving to keep it under 1,5 degrees Celsius. In addition, an EU Taxonomy classification system is created to help develop sustainable projects in the EU and help implement the EU green deal. The taxonomy provides a list of environmentally friendly and sustainable economic activities for investors, companies, and policymakers. (European Commission, 2021b)

ESG factors are being more accepted as part of companies' valuations. For example, in a McKinsey & Company (2020, 5) survey, more than seven in ten executives and investment professionals say that they partially or fully take ESG factors into account in their evaluations and analyses for a company, its competitors, and supply chain process. Sustainable development and CSR in companies has not only impacted the operating businesses, but it has also impacted several other functions, such as reporting. There are, for instance, sustainable standards made for reporting. The standards help the transparency and comparability of companies. (GRI, 2021)

As awareness in ESG grows and it increasingly impacts how companies operate, the possibilities of ESG should be more researched. Therefore, I want to take part in the discussion of whether ESG factors create value and increase the corporate financial performance (CFP) of companies. This thesis interprets the relation between ESG scores and the performance of European

companies during 2002-2019. In this paper, corporate financial performance is measured by profitability, valuation, and cost of debt.

1.1. Purpose and objective of the thesis

There is an ongoing discussion about what is considered a company's responsibility and to what extent corporate responsibility will be affecting companies in the future. Even though plenty of studies and researches have been made on the ESG factors, ESG as a topic is still relatively new. Moreover, the results of the studies are contradictory. It seems there is still space for more studies about the topic. This thesis aims to provide correlations and connections between corporate social responsibility and the corporate financial performance of European companies. This paper also presents results and findings of earlier studies. Furthermore, the differences between the earlier results and the results in this paper are also discussed and compared.

This thesis is for those who want to know more about the possibilities of ESG in general, or more specifically, if and how European companies have benefited from focusing on corporate social responsibility. The literature used in this paper also provides a good overview for those interested in ESG and who want to read more literature on the topic. The literature explains corporate social responsibility (CSR), socially responsible investing, elements and emergence of ESG, and sustainable financing. However, this thesis does not provide how ESG factors can or should be utilized in businesses or operations.

1.2. Research questions and methodology

This thesis observes the relation between ESG scores and corporate financial performance through key figures. The key figures are return on equity (ROE), return on assets (ROA), Tobin's Q, and cost of debt. The first two represent the company's profitability. Tobin's Q measures the valuation, and it is often used in studies to reflect the valuation of a company. Cost of debt is the ratio of how cost-efficiently the company can have financing. Similar or same key metrics are often used in the earlier studies, but not many studies focus on European companies. To reach

the goal of the thesis and to observe the relation of ESG scores and financial performance, the thesis answers three research questions.

- 1) *How does ESG score affect the performance, and has the possible impact changed over time?*
- 2) *How do individual scores E, S, and G affect the performance?*
- 3) *How have high and low ESG performance companies performed financially?*

The first question tells if there is, in general, any connection between key figures and ESG scores for the whole period and if the possible connection is positive or negative. The results for the entire period cannot be generalized because there are limitations. When observing the entire period, the relation is assumed to be linear, and in reality, it most likely is not. The question also answers if the possible impact has increased or decreased over time. This problem is observed using interaction terms that tell if ESG score's impact is higher, lower, or more significant in some years than in others.

The second question observes the environmental, social, and governance individual pillar scores. The results show which individual score has had the most impact on the performance figures in the whole period of 2002-2019. Similarly, as in the first research question, the relation is assumed to be linear, and in reality, it most likely is not.

The third question focuses on companies with high and low ESG performance. The question answers if companies focusing more on ESG issues have historically gained financial benefits through the key figures. The results show if high ESG performance companies have financially performed better than others and if low ESG performance companies have performed worse than others. The results also analyze if the utility in the performance when a company has a high ESG score is higher than the loss in performance if a company has a low ESG score.

1.3. Structure of the thesis

The second section focuses on the theory and the background. The section covers the concepts and terms relevant to the research. The section goes through corporate social responsibility, socially responsible investing, growth and emergence of ESG, and sustainable financing. The purpose is to provide the reader with a general overview and introduction to these topics. Literature about the history and changes in the concepts related to sustainability and ESG is also provided. The third section covers the findings and results of earlier studies on the relation between ESG performance and corporate financial performance.

The fourth section covers the data, outliers, subsampling, limitations, methodology, and regression models. Hypotheses based on the literature and the results of earlier studies are also conducted, presented in the fourth section. The section also explains and justifies the methods for the regression models. The fifth section presents the results of regression models. The sixth section answers the research questions and discusses the results of this paper. The section also covers the limitations of the research and provides ideas and topics for further analysis. In the end, there are references and appendices used in this paper.

2. Theoretical framework

The first subsection provides definitions and theories for corporate social responsibility and socially responsible investing. The second subsection explains the meaning and growth behind ESG factors. Sustainability in the financial markets is covered in the last subsection.

2.1. Defining corporate social responsibility (CSR)

It is continuously debated what is considered a company's responsibility in terms of corporate social responsibility. The literature agrees that there is no one correct definition for CSR. The definitions are generally related to the business affecting itself and the surrounding environment and societies. As an example, CSR can be defined as:

“a firm's commitment to maximize long-term economic, societal and environmental well being through business practices, policies and resources.” (Du, Bhattacharya, and Sen 2011, 3)

“Corporate social responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large.” (Richard and Watts 2000, 8)

Growther and Güler (2008, 15–17) give a basis for the elements of CSR. They divide CSR into three main principles, *accountability*, *transparency*, and *sustainability*. They describe these principles as mandatory factors for a successful CSR strategy.

- 1) *Accountability* refers to a company recognizing and taking responsibility for its actions, which can have an effect on the external environment. When it comes to responsibility in reporting, a company should inform the parties or individuals affected by the actions or operations made by the company. Responsible reporting includes reporting such things as, for example, the

relevance of the information, accuracy of measurements, and comparability and on who the report concerns. Responsibility, together with accountability, is connected to the acceptance of the organization being a part of a broader social environment.

- 2) *Transparency* means that the impacts and information of the actions or operations should be visible and ascertained from the company's published reports. All the effects and other information should be found out with the reporting standards or the method the company has chosen to use. No relevant information should be left out or disguised in the complexity of the report.

- 3) The last one is *sustainability*. The critical part of sustainability is that organizations must not use more resources than necessary. The quantity of resources is finite, and resources used now are not available in the future. This leads to the issue of decreasing resources in the future and costs of resources increasing. Therefore, sustainability is about creating and regenerating the same amount or more resources than consuming.

In a report called *Our Common Future*, published by World Commission on Environment and Development (1988), there are seven strategic imperatives for sustainability. The report is also known as the Brundtland report. It is well known as a basis from where one of the definitions for *sustainability* originated. The imperatives for sustainable development are:

- 1) Reviving growth,
- 2) changing the quality of growth,
- 3) meeting essential needs for jobs, food, energy, water, and sanitation,
- 4) ensuring a sustainable level of population,
- 5) conserving and enhancing the resource base,
- 6) reorientating technology and managing risk, and
- 7) merging environment and economics in decision making.

As the definitions for CSR indicate, organizations take actions that do not only have an impact on the business itself but also on the business environment, local environment, and global environment. Organizations can impact multiple ways, for example, they can enhance communities by increasing employment, allocating resources, and increasing competition. This can lead to, for example, more companies, which leads to increasing employment, and distribution of wealth. As CSR activities also affect internal and external stakeholders, there can be a debate whether some CSR actions have a positive impact. Some may see specific CSR-related actions as beneficial, and others may see them as harmful. In addition, the same actions can be beneficial in certain situations or specific times but harmful in other situations or times. This can create a tradeoff and controversy between stakeholders. (Growther and Güler, 2008, 13)

Porter and Van Der Linde (1995) explain that there used to be a prevailing view between managers about the tradeoff between ecology and economy. In this tradeoff, the other side strives for environmental standards, and the other resists those standards because of increasing costs and reducing competitiveness. Porter and Van Der Linde deny the tradeoff of ecology versus economy because it assumes that everything except regulation is constant (technology, products, processes, and customer needs). This would lead the environmental regulation to raise costs. Instead, they argue that environmental standards can lead to innovative solutions that benefit both costs and the environment. Therefore, competitiveness can be enhanced with the right kind of regulation. In addition, Porter and Van Der Linde argue that pollution means resources have not been used efficiently or effectively. They conclude that managers and regulators should focus on including the opportunity costs of pollution, wasted resources, wasted effort, and diminished product value to the customer.

Crane, Matten, and Spence (2013, 5–7, 13–14) cover corporate social responsibility in global and organizational contexts. They list six core characteristics relevant to well-managed CSR for a company.

- 1) *Voluntary activities* that are beyond the legal minimum that is required by the law.

- 2) *Internalizing and managing externalities* means the side effects which affect others, such as pollution. By regulation, the pollution fines can be used to force the companies to internalize the pollution costs.
- 3) *Multiple stakeholder orientation* refers to CSR covering different variables, impacts, and responsibilities, which concerns stakeholders other than just shareholders. Other stakeholders can be, for example, internal (employees and managers) or external (government, consumers, communities, and other companies).
- 4) Corporate social responsibility includes aligning with social and economic responsibilities.
- 5) *Practices and values* refer that CSR includes business practices and actions that handle social responsibility issues and also to name a philosophy purpose or values that represent these actions and practices.
- 6) The last one focuses on *philanthropy*, which points out that CSR should not be a separate function but should be united with the company's core business operations and functions.

They also mention that CSR, for example, providing healthcare or fighting climate issues, could be seen among the US companies before European companies. In the EU, it was seen that many CSR-related issues were the government's responsibility. Therefore, companies' involvement in CSR issues depends on the laws and regulations set by the government. Because of the differences in regulation, the involvement in CSR issues is far more visible in multinational companies.

2.2. The growth of CSR and ESG

In the 1960s, the early phases of socially responsible investing emerged. Back then, the concept of SRI was more related to, for example, faith-based investing and civil rights. ESG investing has gained much attention during the 2000s primarily because of poor corporate management and environmental issues, especially climate change issues. ESG focuses on how well the company is prepared to make a business from the following aspects: limited natural resources, more strict burdens and standards, a growing human population, and environmental issues. ESG factors

have impacted the ways companies operate, but the factors have also affected other functions. (Townsend 2020, 1–2, 6)

“What began as a way to align portfolios with faith-based and progressive values has evolved to help Wall Street account for previously overlooked global risks and has influenced everything from accounting practices to listing requirements on public exchanges.” Townsend (2020, 13)

Figure 1 shows a timeline of the evolution of sustainable investing in a report published by Deutsche Bank Group written by Fulton, Kahn, and Sharples (2013, 11).

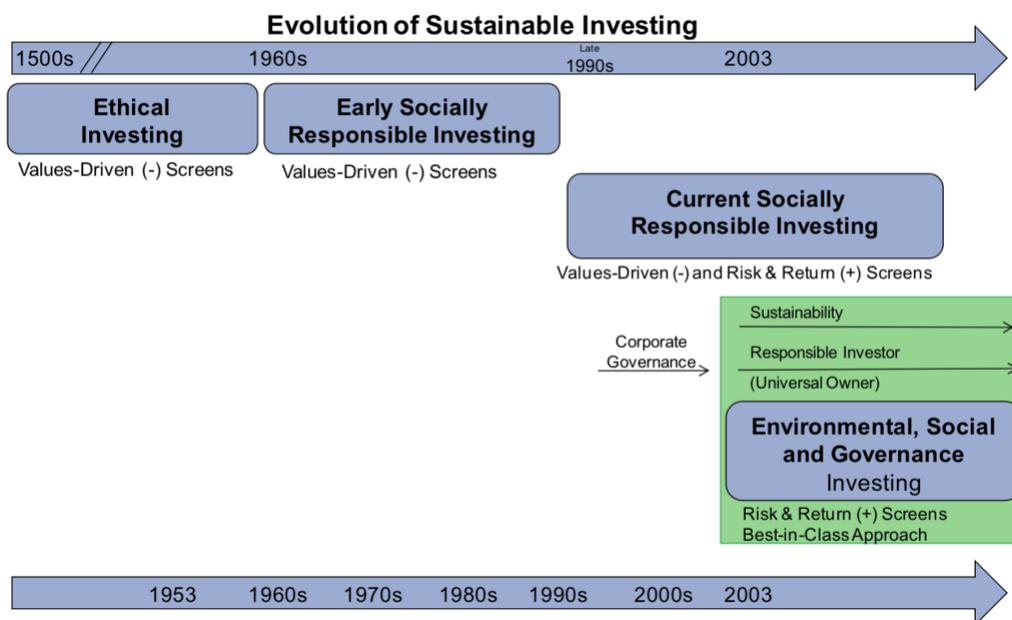


Figure 1. Timeline of Evolution of Sustainable Investing

Fulton et al. (2013, 21-22) describe that socially responsible investing started from ethical investing, which arose during the 1500s. Ethical investing was connected to, for example, avoiding investing in tobacco and gambling industries. Later in the 1960s, SRI was implemented as an investing strategy, and it emerged as a new concept. The early concepts of SRI derive from value-based investing, which means investing in companies or industries that align with investor's values. The early phases of SRI lasted until the mid-1990s, when the current or new SRI emerged. In general, the current SRI utilizes the value-driven and risk & return-driven investment methods

to maximize financial return while investing in companies and industries that align with investor's values.

A well-known concept, *the triple bottom line*, also advocates SRI. According to the concept, companies should focus on measuring the economic (bottom line) factor, ecological (environmental) factors, and social (people) factors to achieve success in the 21st century. The triple bottom line concept was developed by Elkington (1997) in the 1990s. From the mid-1990s and especially during the 2000s, SRI shifted more into the modern form of sustainable investing. In other words, SRI moved into including environmental, social, and governance issues into investment strategies, and the concept of ESG investing emerged. (Fulton et al. 2013, 21-22)

The Principles for Responsible Investment (PRI) is an independent proponent of responsible investments initially started in 2005 by a group of the world's largest institutional investors. PRI encourages investors to shift into responsible investments and understand the meaning and impact of corporate responsibility. They help investors to understand ESG factors and use them in investment decision-making. The purpose of PRI is to create more sustainable investing markets. (UNPRI, 2021)

PRI has created six principles with professional investors for investors to move investment markets more towards sustainable investing. Principles are made to raise awareness of ESG factors and help investors utilize the factors in decision-making. By signing the principles, investors commit to using them in their investing and valuation analyses, implementing them in their decision-making, evaluating the effectiveness of the principles, and improving the principles. These activities can also be found on a PRI signatory base. The principles are the following:

- 1) We will incorporate ESG issues into investment analysis and decision-making processes.
- 2) We will be active owners and incorporate ESG issues into our ownership policies and practices.
- 3) We will seek appropriate disclosure on ESG issues by the entities we invest in.

- 4) We will promote acceptance and implementation of the principles within the investment industry.
- 5) We will work together to enhance our effectiveness in implementing the principles.
- 6) We will each report on our activities and progress towards implementing the principles.

The signatures in PRI principles have been increasing every year, and the slope of the number of signatories has steepened during the last couple of years. The assets under management have also increased every year. This shows a significant growth in the relevance and influence of ESG factors. Figure 2 shows the growth of the assets under management and the signatories.

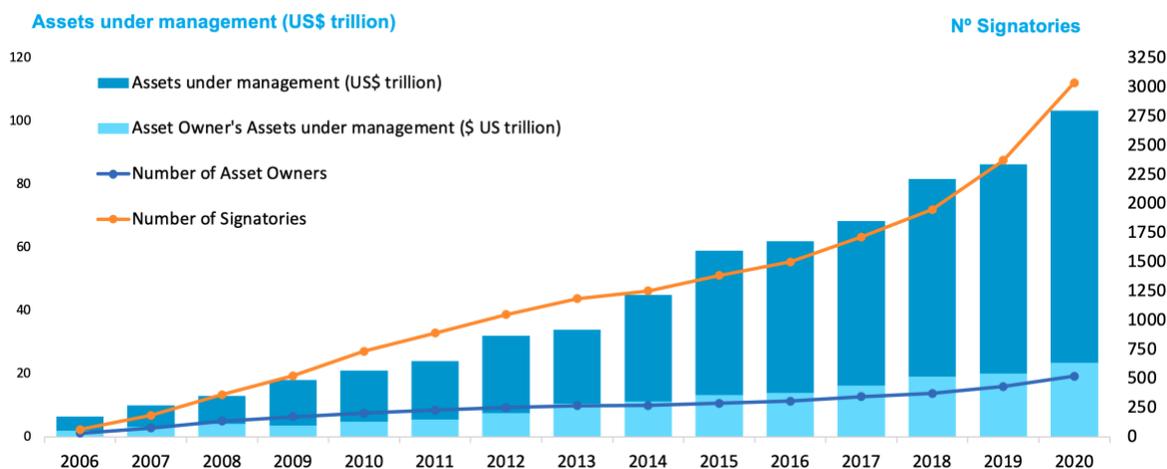


Figure 2. Assets under management and number of signatories (UNPRI, 2021)

The assets under professional management that use SRI strategies have grown lately at an increasing pace. For example, a report on US Sustainable and Impact Investing Trends (USSIF, 2020, 1–3) shows that the number of assets grew from \$12 trillion from the beginning of 2018 to \$17.1 trillion at the beginning of 2020 increase of 42%. This is 1/3 of the total US assets (\$51.4 trillion) under professional management. The top specific ESG criteria for money managers are climate change, carbon, anti-corruption, board issues, sustainable natural resources, agriculture, and executive pay.

The emergence of ESG has also changed the way companies report. Combining sustainable and financial reporting can be referred to as integrated reporting (IR). It was noticed that reporting guidelines do not provide enough non-financial information, and integrated reporting is one of the solutions for this. The point of integrated reporting is to combine a company's financial information with its non-financial ESG information to show the short-term and long-term effects between ESG performance and CFP using guidelines, standards, and the company's unique key performance indicators. (Fulton et al. 2013, 26)

As a part of making the governance, environmental and social factors more measurable and visible, there are global standards for sustainable and integrated reporting. When it comes to sustainable reporting guidelines, one of the largest organizations is the Global Reporting Initiative (GRI). Their guidelines help investors ascertain value or information about the company and its risks related to sustainability and responsibility. The reporting standards are also valuable to the company itself and other stakeholders, for example, policymakers, markets, and society. The standards enhance companies' transparency, reliability, comparability, and accountability. (GRI, 2021)

GRI is not the only one in guiding companies towards sustainability. For example, European Parliament has made a directive 2014/95 that requires large companies (more than 500 employees) to release non-financial information about their operations. More specifically, the social and environmental impacts of their activities. Currently, this covers approximately 11 700 companies in the EU. The directive guides companies to disclose information about environmental and social matters, treatment of employees, respect for human rights, anti-corruption and bribery, and diversity on company boards. Another example of guidelines companies can follow to take part in sustainable development is a standard made by the International Organization for Standardization (2010) called ISO 26000. ISO 26000 is not a certificate, but it rather provides a basic understanding of social responsibility. The standard is for all types of organizations globally, regardless of their size. The aim is to help organizations achieve social responsibility benefits and shift social responsibility principles into actions.

2.3. Sustainability in the financial markets

The target of the EU green deal is to shift the EU more into a resource-efficient, modern, and sustainable economy. The EU green deal includes actions and targets concerning, for example, climate, energy, agriculture, transport, industry, finance, and regional development. To achieve the targets in the green deal and other climate and energy targets set by the EU for 2030, investments must be shifted more into sustainable projects and activities. (European Commission, 2021a)

EU taxonomy is a classification system created to help in this transition. The taxonomy regulation was published in the Official Journal of The European Union in June 2020. It is meant to be a common language that defines clear definitions for sustainable economic activities and investments. All stakeholders can utilize the EU taxonomy. For example, investors can focus on more climate-friendly investments, or companies can utilize the list of sustainable economic activities in their operations. It is not a mandatory list of activities but a list to help the markets shift towards sustainable practices, activities, and investments. (European Commission, 2021b)

One of the consequences of the actions made to improve sustainability, like the EU taxonomy, is that investments in green projects have risen during the 2010s. However, even though more effort has been put into green investments, in 2017, the rise of green projects declined by 3%, primarily because of the lower rate of return and higher risk. There is a risk that this will slow more. There are multiple barriers to financing clean projects. For example, projects cannot find financing with reasonable cost because these projects are seen as high-risk projects. There are solutions to increase the deployment and returns of green projects, for instance, fiscal policy. Tax relief or tax credits are one way of increasing green projects. If a company deploys a green project, it can use tax credits to lower taxes. A dilemma in green projects is that green projects require long-term financing. Because banks deposits are usually short or medium term, this creates a challenge for banks to allocate financing to green projects from deposits. (Yoshino *et al.* 2019, 3–10)

To answer the barriers of green financing, green banks are financial institutions that offer financing for green projects at a reasonable cost and often with longer maturities. Green banks can help

smaller projects to achieve larger scale commercially. For example, clean energy projects can improve credit scores and more efficient credit processes. They can also build portfolios that can attract institutional investors or private capital. (Coquelet, 2016, 1)

The rise in the demand for greener products, services, and investments has led to the growth of green finance. Multiple new methods have been created for green financing, for example, green bonds, green banks, green cards, green car loans, and mortgages. Green finance is seen more as future-oriented financing, which exploits the new technologies, industries, financial products, and services that take into account different sustainability issues, such as environmental, energy, pollution, and recycling. (Rakić and Mitić, 2012, 54–59)

Once the green project has gone through the construction phase and is fully operational, green bonds can provide long-term and cost-efficient refinancing for the project. They can also be used to build a portfolio of green assets to get the attention of institutional investors. In general, green bonds have been shown to attract private capital and allocate capital to more profitable long-term investments. In addition to profitability, green bonds can help achieve commission and gas reduction targets and implement clean energy policies. (Coquelet, 2016, 3-5) Figure 3 shows the historical cumulative returns of investment-grade bonds and green bonds.



Figure 3. Cumulative returns for bonds (International Energy Agency, 2020, 178)

The use of green bonds has increased lately, but it is not the only product in the green financing sector that has gained attention. Sustainability-linked loans (SLL) are another financing product used in the green financing sector. According to Loan Market Association (2019), SLL products can be loans like bonding lines, guarantee lines, or letters of credit. SLL aims to have better loan terms by improving the borrower's sustainability performance through chosen key performance indicators.

Loan Market Association has created core components for sustainability-linked loans. The sustainability performance is measured by unique sustainability performance targets determined in the loan terms. The sustainability-linked loan principles are divided into four core components. The components are not mandatory but are recommended guidelines by Loan Market Association.

- 1) *Relationship to borrower's overall corporate social responsibility (CSR) strategy* refers to the borrower informing and communicating its sustainability objectives as determined in its CSR strategy.
- 2) *Target setting - measuring the sustainability of the borrower.* Target setting includes setting sustainable performance targets tied to the borrower's business and sustainability improvement.
- 3) *Reporting* means that the borrower should have up-to-date information concerning sustainable performance targets for those participating in the loan.
- 4) *Review* component refers to external review that is negotiated between the borrower and lenders.

Figure 4 shows the growth of different green financing products. The figure indicates strong growth in the green bonds but relatively higher growth in sustainability-linked loans. Thus, green bonds and sustainability-linked loans are the most popular financing products, and green loans are the least popular when measured by total value.



Figure 4. Sustainable debt issuance (International Energy Agency, 2020, 177)

Nordea Bank, a European financial services company operating primarily in Northern Europe, published in their full-year 2020 results report that they are reducing carbon emissions from their lending and investment portfolios. The target is to reduce 40-50% by 2030 and achieve zero emissions by 2050. (Nordea, 2020, 15) Nordea's actions are just one example of how sustainability in the banking sector is getting much more attention. This change will have an impact on the financing of companies. Companies will have to shift more focus on positively impacting ESG issues in their businesses to get financing. If this trend continues, companies against the sustainable transition may have to pay more interest and costs to get financing. Depending on how sustainability trend develops in the financing sector, they might not even get financing at all.

3. Prior empirical evidence

Numerous studies have been published concerning ESG and its effects on corporate financial performance. The third section focuses on the results and insights of earlier studies.

3.1. Evidence on sustainable investing

There used to be a difference between traditional investing and investing, which aligns with the investor's morals, so-called socially responsible investing. The view was that investors should be making as much money as possible using all the legal methods available. If the investor wants to participate in charity, then the investor can donate from the profits gained from investing. SRI-investing was seen as a wrong way to invest or even offensive to traditional investing, and the possibilities of corporate sustainability were not seen important. At least this was the case until the most socially responsible firms understood early that for SRI to gain recognition, their strategies needed to be evaluated against the conventional benchmarks for both risk and return. From ignoring the importance of sustainability metrics, they are now seen as value-creating metrics. Several studies have been published on the impacts of sustainability on corporate financial performance. However, the results can be mixed. (Townsend, 2020, 11)

Nofsinger and Varma (2014) propose in their study that funds focusing on socially responsible attributes outperform traditional funds during market crises, and this is because of the socially responsible company's dampening downside risk. They argue that better ESG performance makes companies less risky, and they are more likely to manage crisis periods better. According to the study, the dampening downside risk comes at the cost of underperforming during non-crisis periods. For generating positive alphas during a market crisis, they suggest focusing on the desirable SRI attributes rather than getting rid of the undesirable ones.

One reason for ESG funds performing better in crisis periods and underperforming in non-crisis periods could be the prospect theory developed by Kahneman and Tversky in 1979. Under the theory, investors with the prospect theory elements are more negatively affected by losses than

positively affected by profits. Therefore, the utility gain for performing better in bear markets is larger than the loss in utility for underperforming in bull markets. In other words, investors are willing to underperform in bull markets if they perform better in bear markets, even if the total gain, in the end, is the same.

According to a survey made by Yankelovich Partners Inc, 80% of investors would not invest in the socially responsible fund unless the expected rate of return is more or the same as in a conventional fund. (Krumsiek 1997, 29) However, if the survey was made today, the results might differ. As mentioned in the USSIF (2020, 1-3) report, the assets under professional management that use SRI strategies have increased 42% from 2018 to 2020, indicating SRI funds' growth and increasing interest in socially responsible funds. This is an example of the massive growth in the demand for corporate social responsibility.

In a McKinsey & Company (2020) survey, most business leaders and investment professionals say that ESG factors create short-term and long-term value. Also, the amount of increase in value from each program has changed during the ten years in the survey. The respondents mention that one of the most critical parts of ESG performance is to comply with the regulations and industry expectations.

Figure 5 shows the share of respondents in the survey who say a given program of individual factors creates value long-term and short-term. The question was asked from respondents who say ESG programs create value in general. For example, in 2009, the most answered program for long-term value is environmental programs and governance programs for short-term value. The share of respondents saying the ESG programs increase value has increased in every program during 2009-2019. However, relatively the most significant increase is in the social factor for both long-term and short-term.

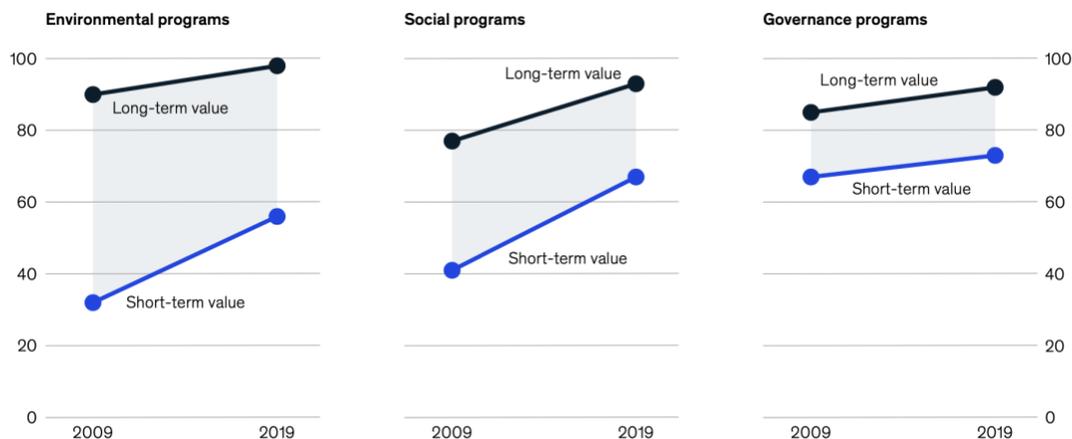


Figure 5. Survey results (McKinsey & Company, 2020, 3)

Most of the executives and investment professionals in the survey say that ESG factors affect corporate performance. The respondents also answered how they believe ESG creates value in the survey. In 2009 and 2019, the most important ways ESG creates value are by maintaining a good brand and reputation and attracting and motivating talented employees. The most positive change from 2009 to 2019 is in strengthening organization's competitive advantage. The most negative change is in improving operational efficiency or decreasing costs. The survey also shows a desire to improve the ESG data, metrics, standards, and reporting. Especially investment professionals want more standardized ESG data integrated into financial data that is readily benchmarked.

Edmans (2011) investigates the relationship between social factors through employee satisfaction and long-run stock returns. He finds that a value-weighted portfolio of the "100 Best Companies to Work for in America" has returned 2.1% above industry benchmarks during 1984-2009. The "best" companies also were more prone to positive earnings surprises. He suggests that these positive surprises might be because social intangibles can be harder to quantify and measure.

Derwall, Koedijk, and Ter Horst (2011) find that companies with higher employee relations and community involvement earn abnormal returns compared to counterparts with worse corresponding features, which is in line with other studies. The abnormal returns apply only short-term, and the abnormal returns diminish in the long-term for socially responsible stocks. They

argue that the economic value in CSR practices is difficult to measure in the short-term, but in the long-term, investors should be able to include the CSR value in a company's fundamentals.

Baier, Berninger, and Kiesel (2020) analyze the words of environmental, social, and governance in annual reports. They find that governance and corporate governance are mentioned more often in annual reports than environmental or social. They argue that this can indicate that the focus is more on shareholders than other stakeholders. They point out that governance issues have been discussed to a more extent historically, but environmental and social have gained more attention during the last decade.

3.2. ESG impact on profitability

As mentioned, Porter and Van Der Linde (1995) point out that managers should shift focus on the opportunity costs of pollution, wasted resources, wasted effort, and diminished product value to the customer. The study made by Al-Tuwaijri, Christensen, and Hughes (2005) investigate the relations of economic performance, environmental performance, and environmental disclosure. They are in line with the conclusion made by Porter and Van Der Linde that managers should focus more on environmental pollution's opportunity costs. They add that the quality of the management plays a significant role in the economic and environmental performance. The study also finds that companies that perform environmentally well publish more environmental information compared to counterparts with poor environmental performance. This also indicates that combining sustainable reporting with financial reporting can be beneficial.

Busch, Bassen, and Gunnar (2015) have gathered several studies concerning the relation between ESG score and corporate financial performance. The number of econometric review studies concerning ESG-CFP relation has been relatively high during the first 15 years of the 21st century compared to the last 15 years of the 20th century. Out of all the gathered 2200 studies, approximately 90% found the relation of ESG and financial performance non-negative. Within these 90% non-negative studies, 47.9% of vote-count studies and 62.6% of meta-analysis studies showed positive findings.

As stated earlier, CSR policies and standards can be different between countries. Garcia, Mendes-Da-Silva, and Orsato (2017) point out this can lead to the fact that the effect of the company focusing on ESG might differ in different sectors and areas. Garcia et al. (2017) study the relation of ESG performance and corporate performance in emerging countries in sensitive sectors such as tobacco, alcohol, and gambling industries. However, in the study, the best environmental performance was among companies in sensitive industries or companies that are more likely to cause harm to society. They add that this can be because companies in sensitive industries disclose information about their CSR performance to defend their brand image and reputation.

Cornett, Erhemjants, and Tehranian (2016) study the relation of CSR and banks' financial performance in the financial crisis of 2008. Their study finds that banks with better CSR policies are rewarded with better financial performance. Furthermore, the findings suggest a positive correlation between return on equity and CSR performance.

Not all the studies show positive results between CSR performance and profitability. Bauer, Guenster, and Otten (2004) study the impact of governance factors on profitability through net profit margin and return on equity. On the contrary to earlier studies, they found a negative correlation between the variables. They suggest one reason for this can be that accounting measures are biased numbers of the firm's performance or that worse managed companies are less conservative with their earnings estimates, but this hypothesis requires further research.

Di Giuli and Kostovetsky (2014) also find contradictory results in their study of companies from the Russel 3000 index. Naturally, a company focusing more on CSR spends more money and resources on CSR. However, they find no evidence that these companies get more gains through increased sales on their CSR investment. The company does not recover from these expenditures, leading to lower stock returns and declines in return on assets. Thus, a company making efforts in CSR comes at the expense of a decline in firm value.

3.3. ESG impact on valuation

There are several metrics to measure the valuation of a company, and in this research, Tobin's Q is used. Tobin's Q is often used in studies concerning ESG and valuation. For example, Wong, Batten, Ahmad, Mohamed-Arshad, Nordin, and Adzis (2020) study if Bloomberg's ESG rating positively boosts firm value through Tobin's Q. They found out that after receiving an ESG rating from Bloomberg, Tobin's Q of companies increased by 31,9%, which is a substantially high increase.

Galema, Plantinga, and Scholtens (2008) made a study researching the relation between company involvement in social responsibility and stock returns. The results show that SRI involvement leads to better stock returns by lowering the book-to-market ratio and not by positive alphas. They argue that this is because of the demand imbalance between SRI stock and conventional peers. In the study, portfolios positively linked to diversity, environment, and products have had better stock returns.

As companies that focus more on ESG factors also tend to disclose more ESG information, it is worthwhile to look at how integrated reporting affects performance. Baboukardos and Rimmel (2016) study the effects of integrated reporting. They find a positive relationship between integrated reporting and equity valuations on the South African stock market. Their empirical research also points to a decline in the value of net assets. They argue that this can be because of the more strict and accurate reporting standards set by integrated reporting. Camodeca, Almici, and Sagliaschi (2018) applied an artificial model to analyze the integrated reporting of European listed companies. On the contrary to the positive results by Baboukardos and Rimmel (2016), Camodeca et al. (2018) found no effect on market valuations from sustainability disclosure through integrated reporting.

A study made by Gompers, Ishii, and Metrick (2003) studies the impact of corporate governance on 1500 large firms during the 1990s. The study results clearly show that companies with better shareholder rights have had higher Tobin's Q. At the beginning of the period, there was already

a strong positive correlation. However, the correlation increased significantly by the end of the period, meaning the impact of governance performance on CFP has increased over time.

Core, Guay, and Rusticus (2006) investigate the Gompers et al. (2003) findings further that weak shareholder rights lead to underperformance in the stock market. Core et al. point out that weak governance also leads to weak operating performance. However, weak governance does not correlate with negative earnings surprises in the forecasts made by analysts.

Ammann, Oesch, and Schmid (2011) find that firm-level corporate governance has a substantial positive effect on firm valuation. In addition, they find a positive correlation between social behavior and firm value. Furthermore, they find that for an average firm in the sample, implementing corporate governance mechanics leads to higher cash flows for investors and a lower cost of capital.

Bauer et al. (2004) analyze the governance management correlation to valuation in the UK and the Eurozone during 1996-2001. The results suggest a more substantial relation in the Eurozone compared to the UK. They argue that this is because the governance standards tend to be lower in the Eurozone and are already included in the stock price. The market in the UK was still adjusting to the governance standards during 1996-2001. Auer and Schuhmacher (2016) find in their study that in Asia-Pacific regions and the US, investors that focus more on the highly ESG-scored companies do not perform better. Similar results apply in the European sample, but investors are more likely to pay a higher price for socially responsible investment in Europe.

3.4. ESG impact on cost of debt

One of the models made by Wong et al. (2020) suggests that after receiving Bloomberg's ESG rating, the cost of capital decreased by 1,2%. This is a relatively high decrease since the companies had an average of 8,9% in the data sample. In other models, they found out that ESG enhances the cost of equity, but ESG had no impact on cost of debt. In a study by Bassen, Meyer, and Schlange (2006) researching a similar topic, the main finding is that corporate responsibility

risks have a significant role in financing a company, whether debt or equity. A well-managed corporate responsibility leads to lower regulatory risks and lower risk exposure, leading to a lower cost of debt.

Goss and Roberts (2011) study the relation between bank loans and corporate social responsibility. In the study, banks see companies with CSR concerns riskier, and in this case, banks offer a loan contract with less attractive loan terms. In more detail, the results suggest a 7-18 basis points increase in cost of debt among companies with CSR concerns compared to responsible companies.

Bauer and Hann (2010) researched the correlation between environmental metrics and corporate debt. Their results show that firms that do not focus on regulatory and environmental factors, mainly climate change, pay a premium and have worse credit risk scores. On the contrary, companies that engage with these issues pay a lower cost of debt, have better credit risk scores, and lower bond spreads.

3.5. Summary of the prior findings

Several studies concerning sustainable development and CSR have been published, and more studies are published every year. There are contradictory results on how CSR affects performance, but more often, corporate social responsibility has had a positive influence on corporate financial performance.

There has usually been a positive or at least non-negative correlation between profitability and ESG scores in the earlier studies covered in this paper. However, some studies propose a negative correlation. The correlation between corporate social responsibility and valuation through Tobin's Q has been positive. Investors are more likely to pay higher premiums for companies with better ESG performance and CSR policies. The consensus in the studies is that a company making efforts in ESG issues can reduce the downside risk through, for example, regulation. Lower risk usually means lower price and, in this case, lower interest on debt. In the

earlier studies, lower interest on debt is also the consensus when a company has better ESG performance. However, the utility (or possible harm) if a company focuses on ESG issues can vary between industry and country.

The environmental, social, and governance performance have also been researched, and the consensus impact is positive. The governance factor is researched and discussed a lot, if not the most out of the pillar scores. It has had mainly a positive impact, but there are also contradictory results as some studies found a negative correlation between governance and profitability. The environmental factor is studied extensively, and the effects have been mainly positive. The social factor is the least discussed and researched, and this can be as social factors can be the most difficult to quantify. However, the importance of social factors must not be underestimated or ignored.

4. Data and methodology

This section explains the characteristics of the data and the analysis methods used in this paper. The first subsection goes through the data, and then the variables used in the regressions are presented. In the third subsection, the diagnostics, theory, and justification behind the models are explained, and last, the regression models are presented.

4.1. Data

The sample data in this thesis is companies from Euro STOXX 600 index, which is created by STOXX LTD. The index consists of large-, mid-, and small-cap companies weighted by market capitalization. The index includes companies from 17 countries across the European region. The highest number of companies come from Great Britain, France, Switzerland, and Germany.

Refinitiv Eikon is a database providing insights, financial information, and data. In the database, ASSET4 includes data concerning different ESG metrics, and the ESG data of ASSET4 is used in this paper. In addition, the financial data used in this research is gathered from the Refinitiv Eikon database. The time period for the data is 2002-2019.

The data is first transformed into panel data. Panel data means a dataset of several individuals, for example, companies or countries, over several time periods. In modeling, there can be variables that cannot be measured or observed and panel data takes these into account. Baltagi (2005, 4–7) refers to Hsiao (2003) and Klevmarken (1989) and has listed several advantages of using panel data modeling.

- 1) Controlling for individual heterogeneity. For example, there can be several effects between individuals that cannot be observed or measured, like religious, institutional, history, regulation, and political effects. If the heterogeneity is not considered and controlled, the results may be inaccurate or unreliable.

- 2) Panel data allows more informative data, efficiency, variability, degrees of freedom, and it reduces collinearity.
- 3) "*Dynamics of adjustment*" is easier to study. This refers to cross-sectional distributions. For example, repeated cross-sectional data can estimate how the proportion of unemployment changes over time.
- 4) Panel data allow to capture and measure effects that would not be possible in traditional cross-sectional or time series analysis.
- 5) Using panel data, one can test more complex models and behaviors.

Baltagi (2005, 7-9) adds limitations and assumptions that one must consider when using panel data. These limitations include "design and data collection problems, distortion of measurement errors, selectivity problems, short time dimension, and cross-sectional dependence."

4.2. Variables

This subsection explains the dependent, independent, and control variables used in the models. In addition, the reasoning behind the variables is also provided.

4.2.1. Dependent variables and hypotheses

There are several metrics to measure a company's financial performance. Return on equity, return on assets, Tobin's Q, and cost of debt are chosen as key figures for this research. ROE and ROA are chosen to represent the profitability, and the coefficients of these two variables are compared in the regression results. Tobin's Q represents the valuation of a company, and the cost of debt shows how efficiently the company can have financing. Previous studies have also used these metrics to measure financial performance (Bauer et al., 2004; Di Giuli and Kostovetsky, 2014; Wong *et al.*, 2020). That is also the main reason these metrics are used in this paper. Below, the chosen key metrics are explained using the definitions and calculation formulas from Investopedia.

Return on equity, ROE

Return on equity (ROE) provides information about the company's profitability in terms of equity. What is considered a good ROE depends on the industry and company peers. ROE is a more efficient figure if a company is profitable, meaning net income is positive. ROE can be calculated with the following formula:

$$\text{Return on equity} = \frac{\text{Net Income}}{\text{Average Common Equity}} * 100$$

Return on assets, ROA

Like ROE, return on assets (ROA) is a profitability metric, but ROA measures how well a company creates value in terms of assets. ROA also considers a company's debt, which ROE does not. ROA can be calculated using the following formula:

$$\text{Return on assets} = \frac{\text{Net Income}}{\text{Total Assets}} * 100$$

Tobin's Q

In this research, Tobin's Q is used to measure the impact of ESG on the valuation of a company. The definition for Tobin's Q is usually the company's market value divided by its assets' replacement cost. There are several formulas to calculate Tobin's Q. In this research, Tobin's Q is calculated by the sum of total assets subtracted by the book value of equity added by the market value of equity. This result is divided by total assets. A similar formula is used in a study made by Gupta, Banerjee, and Onur (2017, 395–396).

$$\text{Tobin's Q} = \frac{\text{Total Assets} - \text{Book Value of Equity} + \text{Market Value of Equity}}{\text{Total Assets}}$$

Cost of Debt

Cost of debt ratio is a metric to tell how cost-efficiently the company can get debt. It is calculated by dividing the interest paid by total debt. In this paper, the results will tell if ESG score has an increasing or decreasing effect on the interest on debt. In other words, if the financier, for example, a bank, sees a company as more risky or riskless because of its ESG performance.

$$\text{Cost of Debt} = \frac{\text{Total Interest}}{\text{Total Debt}} * 100$$

Hypotheses in this research are based on literature and the results of earlier studies. Below in table 1, the hypotheses are provided. In the final section, the conclusions for the hypotheses are also presented.

Table 1. Hypotheses

	Hypothesis
H1:	ROE and ESG score have a positive correlation
H2:	ROA and ESG score have a positive correlation
H3:	Tobin's Q and ESG score have a positive correlation
H4:	Cost of debt and ESG score have an inverse correlation
H5:	The impact of ESG score has increased during time
H6:	Individual pillar scores are positively linked to CFP
H7:	High ESG score is linked to better performance
H8:	Low ESG score is linked to worse performance

The impact on profitability in the previous studies has usually been positive, and therefore, profitability through ROA and ROE are expected to correlate positively with ESG scores (H1 & H2). ESG performance can lead to lower risk exposure through, for example, regulation. Thus, the hypothesis is that the ESG score has a decreasing effect on cost of debt (H4). Because of the ESG score leading to better profitability and lower cost of financing, it is assumed that investors

are willing to pay higher premiums for companies that focus on ESG issues. Therefore, the valuation is also assumed to be positively linked to the ESG score (H3).

Because of the evidence in the previous studies and growth of ESG assets and awareness, it is assumed that the impact of ESG score has been increasing over time (H5). Furthermore, because the combined ESG score is expected to be positively linked to performance, it is also assumed that every individual pillar score is positively linked to corporate financial performance (H6). The assumption is that high ESG performance companies have performed financially better (H7), and low ESG performance companies have performed worse (H8). The first five hypotheses are conducted to answer the first research question. The sixth hypothesis is for the second question, and the last two hypotheses are for the third research question

4.2.2. Independent variables

The information about ASSET4 is from a report concerning ESG scores released by Refinitiv (2020). The ESG data in the ASSET4 database is updated yearly according to the company's ESG disclosure. In general, the ESG data is available from around 2002 and for over 10 000 companies globally. The ESG data is based on public verifiable reported data. The scores range from 0 to 100, with 100 being the maximum score a company can have. Figure 6 shows what the individual scores E, S, and G consist of. The individual pillar scores are collected and measured by over 450 company-level ESG measures.

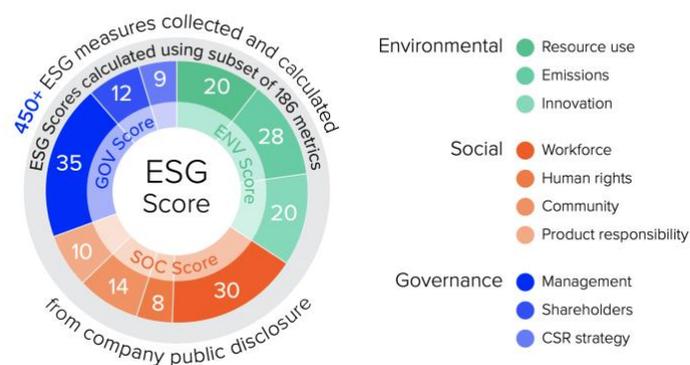


Figure 6. ESG score measures (Refinitiv, 2020, 6)

ESG score combines all the individual pillar scores. In the ASSET4 data, the ESG pillar score is a relative sum of the category weights, varying for environmental and social measures depending on the industry. The governance measures are the same across all industries.

E, Environmental

Environmental factor includes the energy and resources the company requires for its operations and the waste it discharges. The environmental score also comprehends the carbon emissions and other issues related to climate change. Resource use, emissions, and innovation are the main pillars that define the environmental score in the ASSET4 data.

S, Social

The social score represents the company's reputation and relationships with the communities. The social score also measures the company's influence on society. The main measures for the social pillar score consist of workforce, human rights, community, and product responsibility.

G, Governance

Governance refers to the internal actions, practices, controls, and procedures the company is using to align with the law, itself, and external stakeholders. The main metrics in the ASSET4 data for the governance score are management, shareholders, and CSR strategy.

4.2.3. Control variables

Control variables are used in the models to include other effects impacting the dependent variables than just the effect of ESG variables. This way, the regression model and the coefficients for the variables of interest are more reliable. In this paper, similar control variables are used as the control variables in the studies by Di Giuli and Kostovetsky (2014) and Wong *et al.* (2020).

1) Size

Size is measured as the natural logarithm of total assets. Size effects are captured as larger companies typically have more assets, leading to more operations that can affect the performance.

2) Return on assets

In this paper, return on assets is used as an independent variable but also as a control variable for valuation and cost of debt regression models. Higher profitability influences the performance and is seen positively by, for example, financiers and investors. Therefore the effects of profitability are captured.

3) Leverage

Leverage shows the financial structure of a company. It controls the effects like a company's risk level in terms of debt. In this paper, it is calculated by dividing total debt by total assets.

4) Cash

Cash shows the percentage of change in the amount of cash the company has on its balance sheet at the end of the fiscal year. For example, cash in the balance sheet makes a company prepared for possible unpredicted costs or to pay debt. A company can also use the cash for further investments that generate income, and the variable captures these kinds of effects.

5) Closely-held shares

Closely-held shares show the percentage of shares owned by insiders. For example, investors can see a high percentage of closely-held shares so that the insiders believe in the company. This might attract more investors and raise valuation, and the variable captures these effects.

6) Sales growth

Sales growth variable reflects the yearly change in revenue. Sales growth effects are captured as the change or decrease in revenue influences a company's performance.

7) Fixed or random effects

There can be unmeasurable or unobservable effects on the dependent variables. Therefore, the company, country, and year effects are taken into account. For the first two research questions, individual effects are captured as fixed effects (FE). For the third question, individual effects are captured as random effects (RE). Time (year) effects are captured as fixed effects in every model.

4.3. Diagnostics & models

This subsection explains the data diagnostics and cleaning, theoretical justification, tests for the chosen method, and the final regression models.

4.3.1. Diagnostics and cleaning of the data

Some companies in the dataset have data on the whole time period, and some do not. Therefore, the data is considered as unbalanced data. All the observations without E, S, G, or ESG scores are ignored from the original dataset. In addition, companies that have less than ten years of ESG score data are ignored in the regressions. Removing too many companies or observations may lead to selectivity bias. However, a company having ESG data for only a couple of years may not give statistical power or insightful input to the regression model. The final data includes 421 companies and total yearly observations of 6531.

Table 2. Variable statistics

	Min	Median	Mean	Max	SD
ESG	5.05	61.07	59.09	94.50	19.02
E	0.27	61.79	57.81	99.25	25.59
S	1.64	63.69	60.50	98.64	22.66
G	0.82	59.15	56.95	99.33	22.21
ROE	-142.86	14.23	15.86	179.93	18.50
ROA	-17.96	5.48	6.49	33.36	6.09
Tobin's Q	0.34	1.31	1.67	8.01	1.00
Cost of debt	0.00	4.10	4.74	50.00	4.11
Assets	10.51	16.26	16.49	21.83	1.84
Sales (Growth%)	-1.29	0.05	0.06	1.82	0.19
Leverage	0.00	0.24	0.25	1.67	0.16
Cash	-0.99	0.06	0.27	20.15	1.11
Shares	0.00	15.26	22.48	100.00	22.63

Table 2 shows the statistics of the variables used in this research. There can be outliers and absurd values in the data, which affects the outcome of the models. Thus, the highest and lowest observations above or below 2.326 standard deviations from the mean (98% confidence level) are excluded in ROE, ROA, Tobin's Q, cash, and sales. In addition, all values of over 50% are ignored in cost of debt. It is assumed that a company does not pay interest half its loan amount in a normal condition.

Table 3. Correlation table

	ESG	ROA	Assets	Sales	Cash	Leverage	Shares
ESG	1						
ROA	-0.135***	1					
Assets	0.457***	-0,473***	1				
Sales	-0,088***	0,147***	-0,071***	1			
Cash	-0.029***	0,018	0.014	0,077***	1		
Leverage	0.087***	-0,116***	0.042**	-0,014	0,040***	1	
Shares	-0.148***	-0.025	0,002	0,028***	0.009	-0.015	1

*, **, and *** represents the significance level at 10%, 5% and 1% respectively.

Pearson correlation coefficients are computed to see which variables are highly correlated with each other. Multicollinearity can be an issue in the estimation of the regression models. Table 3 shows the correlations of variables used in this research. As the correlation table shows, none of the variables are highly correlated.

Table 4. Final data by country

	Yearly observations	Number of companies	Percent
United Kingdom	1839	117	27.8 %
France	987	64	15.2 %
Germany	644	41	9.7 %
Switzerland	591	38	9.0 %
Sweden	539	35	8.3 %
Spain	314	20	4.8 %
Netherlands	283	18	4.3 %
Denmark	228	16	3.8 %
Italy	259	16	3.8 %
Finland	204	13	3.1 %
Belgium	167	11	2.6 %
Norway	176	11	2.6 %
Austria	112	7	1.7 %
Ireland	87	6	1.4 %
Poland	44	4	1.0 %
Portugal	57	4	1.0 %
Total	6531	421	100 %

Table 4 shows the final dataset by country. It shows the number of observations, number of companies, and share of total observations. The United Kingdom has the highest number of companies, and they present a little over 27.8% of all the companies. The second-highest number of companies comes from France, with 15.2% of all the companies. The top 3 countries in terms of observations (UK, France, Germany) represent more than half (52.7%) of observations in the whole dataset.

4.3.2. Diagnostics and justification of the models

The general structure for choosing the method for panel data is first to test whether a fixed or random effects model is the more appropriate method using the Hausman test. Then, either F-test or Breusch-Pagan test is conducted depending on the results of the Hausman test. The Hausman test tests if the errors are correlated with the regressors, and the null hypothesis is that they are not correlated. The results of the Hausman test are presented in table 5, and the test is done for every key metric used as a dependent variable. The results show that the null hypothesis is rejected, and therefore the preferred model is the fixed effects model.

Table 5. Hausman test for fixed and random effects models

	ROE	ROA	Tobin's Q	Cost of debt
Chi2(5) Prob > Chi2	19.92 0.00			
Chi2(5) Prob > Chi2		39.48 0.00		
Chi2(6) Prob > Chi2			264.13 0.00	
Chi2(6) Prob > Chi2				94.42 0.00
Null hypothesis Suggested method	H0: Random effects is more appropriate model			
	FE	FE	FE	FE

The individual effects are confirmed using F-test, which shows if an OLS model is better than the fixed regression model. The null hypothesis is that no individual effects are present, and the OLS model is more appropriate. OLS assumes no heterogeneity, so the means of the variables are the same across groups. Table 6 shows the results of the F-tests. For every dependent variable, the F-test rejects the null hypothesis. Therefore, the fixed effects model is preferred.

Table 6. F-test for individual effects

	ROE	ROA	Tobin's Q	Cost of debt
F-value P-value	6.85 0.00			
F-value P-value		10.43 0.00		
F-value P-value			20.39 0.00	
F-value P-value				8.08 0.00
Null hypothesis Suggested method	H0: OLS is more appropriate model			
	FE	FE	FE	FE

As an example of unobserved heterogeneity, below in figure 7, the heterogeneity can be seen in the cost of debt across years. The figure shows visually that the mean cost of debt changes as a

function of time, and the mean trend is downwards, indicating that heterogeneity is present in the data. For instance, fixed effects can be used to capture unobserved heterogeneity.

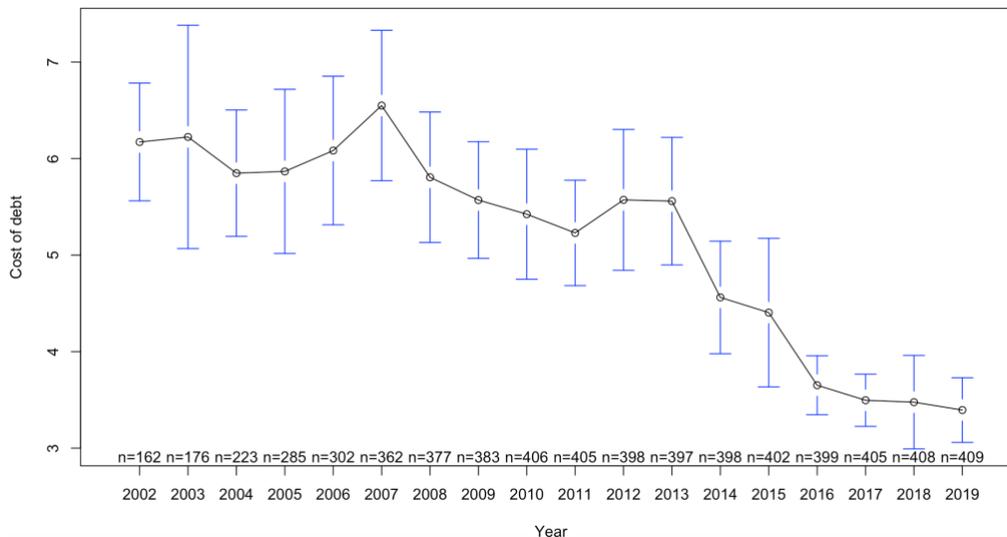


Figure 7. Cost of debt heterogeneity during years

Based on the Hausman test and the F-test, fixed effects (within) estimator is used to answer the first two research questions. However, the dependent variables for high and low variables can be constant over time within a panel. In this case, the FE logistic model omits those observations, and the number of observations can be relatively low. Therefore, the random effects logistic model is more suitable for the third research question, which observes companies with high and low ESG performance.

Heteroskedasticity means that the residuals or errors have different variances. This is one of the OLS core assumptions (Greene, 2008, 10). If homoskedasticity is assumed under heteroskedasticity, the regression results in consistent coefficients, but the estimates are inefficient. The standard errors are also biased, and under heteroskedasticity, the robust standard errors should be computed to capture the heteroskedasticity. (Baltagi, 2005, 79)

Heteroskedasticity can occur on the whole dataset or on one variable. The heteroskedasticity is tested using the Breusch-Pagan test and White's test. The results in table 7 show that heteroskedasticity is present and needs to be considered in the models.

Table 7. Heteroskedasticity

	Breusch-Pagan	White's test
Chi2(1, 27)	4819.08	676.07
Prob > chi2	0.00	0.00
H0	Error variances are equal	Error variances are equal
Result	Heteroskedasticity present	Heteroskedasticity present

Serial correlation (autocorrelation) can be a problem with a long time (T) and short individual (N) panel datasets. Serial correlation means that the observation is dependent on its earlier values. If a serial correlation is ignored, the regression model estimates will be consistent but inefficient. The standard errors will also be biased. (Baltagi, 2005, 84)

Table 8. Autocorrelation test results

Dependent variable	Wooldridge test for autocorrelation in panel data	
ROE	F(1, 411)	13.80
	Prob > F	0.00
ROA	F(1, 412)	53.63
	Prob > F	0.00
Tobin's Q	F(1, 411)	181.08
	Prob > F	0.00
Cost of debt	F(1, 409)	23.12
	Prob > F	0.00

Serial correlation is tested using Breusch-Godfrey/Wooldridge test for serial correlation in panel models. The test results are presented in table 8, and for every test, there is a serial correlation present, and it needs to be taken into account. Stationarity is observed using the augmented Dickey-Fuller and Phillips Pearson tests. The results of the tests for each variable are presented in appendix 1. The results show no unit root in any of the variables.

In conclusion, the clustered robust errors are calculated for every regression model. The standard errors are reported in the tables in the empirical analysis section. Heteroskedasticity and autocorrelation are accounted for using clustered standard errors.

4.3.3. Regression models

In this subsection, the models are presented. In every model, time (year) effects are captured as fixed effects. The FE models capture company and country effects as fixed effects. The logistic random effects models capture company and country effects as random effects. The lower-case letters *i* and *t* in the equations are notations for entities or individuals and time correspondingly.

Combined ESG score

The first research questions observe the impact of ESG score on performance in the whole time period of 2002-2019 and on each year. The equations (1), (2), and (3) represent the impact of ESG on the performance indicators over the whole time period.

$$Profitability_{i,t} = \beta_1 * ESG_{i,t} + Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (1)$$

$$Valuation_{i,t} = \beta_1 * ESG_{i,t} + Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (2)$$

$$Cost\ of\ debt_{i,t} = \beta_1 * ESG_{i,t} + Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (3)$$

where *Profitability* = Return on assets or return on equity,

Valuation = Tobin's Q,

Cost of debt = Total interest divided by total debt,

ESG = Combined ESG score,

Control = Control variables,

α = Unobserved individual (α_i) and time (α_t) specific heterogeneity (fixed and/or random effects), and

ε = Error term.

Impact of combined ESG score on each year

The interaction term is exploited to observe the effect of ESG score on each year. The interaction term is the ESG score multiplied by the year variable. Interpreting the coefficients is different than in the equations (1), (2), and (3). The impact of ESG score on performance is different every year, meaning a different coefficient for ESG each year. The sum of the coefficient for ESG in the reference year and the coefficient for ESG in a particular year is the absolute effect of ESG for the corresponding year. These are also known as marginal effects. Marginal effects, which are the coefficients of interest, are presented in the empirical results, and the full regression results are shown in appendices.

$$\begin{aligned} Profitability_{i,t} = & \beta_1 * ESG_{i,t} + \beta_2 * Year_t + (\beta_3 * ESG_{i,t} * Year_t) \dots & (4) \\ & + (\beta_n * ESG_{i,t} * Year_t) + Control_{i,t} + \alpha + \varepsilon_{i,t} \end{aligned}$$

$$\begin{aligned} Valuation_{i,t} = & \beta_1 * ESG_{i,t} + \beta_2 * Year_t + (\beta_3 * ESG_{i,t} * Year_t) \dots & (5) \\ & + (\beta_n * ESG_{i,t} * Year_t) + Control_{i,t} + \alpha + \varepsilon_{i,t} \end{aligned}$$

$$\begin{aligned} Cost\ of\ debt_{i,t} = & \beta_1 * ESG_{i,t} + \beta_2 * Year_t + (\beta_3 * ESG_{i,t} * Year_t) \dots & (6) \\ & + (\beta_n * ESG_{i,t} * Year_t) + Control_{i,t} + \alpha + \varepsilon_{i,t} \end{aligned}$$

where *Profitability* = Return on assets or return on equity,

Valuation = Tobin's Q,

Cost of debt = Ratio of total interest divided by total debt,

$ESG_{it} * Year_t$ = The interaction term of ESG score and year,

Control = Control variables,

α = Unobserved individual (α_i) and time (α_t) specific heterogeneity (fixed and/or random effects), and

ε = Error term.

Individual pillar scores

The second research question interprets the impact of the individual pillar scores in the whole period 2002-2019. The following regressions are built to answer which individual score has had the most significant effect on the performance.

$$Profitability_{i,t} = \beta_1 * E_{i,t} + \beta_2 * S_{i,t} + \beta_3 * G_{i,t} + Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (7)$$

$$Valuation_{i,t} = \beta_1 * E_{i,t} + \beta_2 * S_{i,t} + \beta_3 * G_{i,t} + Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (8)$$

$$Cost\ of\ debt_{i,t} = \beta_1 * E_{i,t} + \beta_2 * S_{i,t} + \beta_3 * G_{i,t} + Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (9)$$

where *Profitability* = Return on assets or return on equity,

Valuation = Tobin's Q,

Cost of debt = Ratio of total interest divided by total debt,

E = Environmental pillar score,

S = Social pillar score,

G = Governance pillar score,

Control = Control variables, and

α = Unobserved individual (α_i) and time (α_t) specific heterogeneity (fixed and/or random effects), and

ε = Error term.

High and low ESG performance companies

The third question is about observing the financial performance of high and low ESG performance companies. Logistic random effects regression is used to answer the third question. High and low

variables represent the top and worst 10% observations in terms of ESG score. Individual effects are captured as random effects and year effects as fixed effects in the logistic models.

$$High_{i,t} / Low_{i,t} = \beta_1 * Profitability_{i,t} + \beta_2 * Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (10)$$

$$High_{i,t} / Low_{i,t} = \beta_1 * Valuation_{i,t} + \beta_2 * Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (11)$$

$$High_{i,t} / Low_{i,t} = \beta_1 * Cost\ of\ debt_{i,t} + \beta_2 * Control_{i,t} + \alpha + \varepsilon_{i,t} \quad (12)$$

where *Profitability* = Return on assets or return on equity,

Valuation = Tobin's Q,

Cost of debt = Ratio of total interest divided by total debt,

High = a dependent binary variable which tells if a company belongs to the group of the highest 10% ESG performance companies (1 = in the top group, 0 = not in the top group),

Low = a dependent binary variable which tells if a company belongs to the group of lowest 10% ESG performance companies (1 = in the lowest group, 0 = not in the lowest group),

Control = Control variables,

α = Unobserved individual (α_i) and time (α_t) specific heterogeneity (fixed and/or random effects), and

ε = Error term.

5. Empirical results

This section covers the empirical part by conducting a panel data regression analysis on the impact of corporate social responsibility on financial performance. The impacts of fixed or random effects are not presented because they are not the variables of interest. The tables show the coefficients and the clustered standard errors for the independent variables. The statistical significance levels are shown with the codes: '***' ≤ 0.01 , '**' ≤ 0.05 , '*' ≤ 0.1 , and ' ' ≤ 1 .

In the first subsection, the impact of ESG score on performance is tested using regression models for the whole period of 2002-2019 and during each year. Regressions (1), (2), and (3) are used when observing the ESG on the whole period, and regressions (4), (5), and (6) are used when observing ESG each year. The second subsection observes how individual scores E, S, and G have affected performance during 2002-2019. In this subsection, models (7), (8), and (9) are used. Last, the effect of ESG performance among high and low ESG performance companies is interpreted using regressions models (10), (11), and (12).

5.1. Regression results of combined ESG score models

The first subsection focuses on ESG for the whole period. The second subsection focuses on ESG during the years.

5.1.1. Results observing the whole time

First, the impact of ESG score on profitability is tested using regression model (1) on the time period 2002-2019. Table 9 shows the coefficients of profitability models. The coefficient in ROE (1), where company effects are captured, is 0.025. This indicates a 0.025 unit increase in ROE when ESG increases by 1 unit. Changing the fixed effects to country effects in ROE (2), the coefficient changes to 0.072. However, neither of these coefficients for ESG score in the ROE models are statistically significant.

One of the ROA models shows a significant impact. In ROA (2) model, where country effects are controlled, the coefficient is 0.052*** and significant at 0.01 significance level. This model suggests a significant linear connection between ESG performance and return on assets. The coefficient of 0.052 means a 0.052 unit increase in ROA as ESG increases by 1 unit. However, changing the fixed effects to company effects, the coefficient is relatively low (0.007) and not statistically significant at any level.

The results suggest that there has not been a very substantial impact on profitability. However, ESG score has had a more statistically significant positive impact on return on assets than return on equity. Thus, according to these models, a company positively affecting ESG factors can improve profitability through ROA but not through ROE. Therefore, ROE (2) is the only profitability model aligning with the hypothesis.

Table 9. ESG score on profitability

	ROE (1)	ROE (2)	ROA (1)	ROA (2)
Constant	83.770*** (19.820)	39.610*** (3.105)	36.530*** (4.708)	30.340*** (1.820)
ESG	0.025 (0.029)	0.072 (0.047)	0.007 (0.009)	0.052*** (0.017)
Assets	-4.420*** (1.261)	-2.090*** (0.293)	-1.787*** (0.297)	-1.674*** (0.149)
Sales	9.597*** (1.869)	9.028*** (1.306)	2.765*** (0.494)	2.984*** (0.336)
Cash	0.591*** (0.195)	0.366 (0.212)	0.181*** (0.050)	0.135** (0.051)
Leverage	-7.354 (5.797)	0.880 (2.339)	-9.253*** (1.674)	-3.363*** (0.767)
Shares	-0.081*** (0.027)	0.01 (0.026)	-0.025*** (0.009)	0.011 (0.007)
Company	X		X	
Country		X		X
Year	X	X	X	X
Observations	5 821	5 821	5 819	5 819
R-squared	0.075	0.075	0.124	0.249

Robust standard errors in parentheses, *** = p<0.01, ** = p<0.05, * = p<0.1.

Regression model (2) is used to test the correlation between valuation and ESG performance. Results of valuation and cost of debt models are presented in table 10. Valuation models show significant and positive relations. When company effects are controlled, the coefficient is 0.002** and 0.003** when country effects are captured. Both coefficients are significant at the 0.05 level. Thus, there is a positive link between ESG performance and valuation, aligning with the hypothesis.

Table 10. ESG score on Tobin's Q and cost of debt

	Tobin's Q (1)	Tobin's Q (2)	Cost of debt (1)	Cost of debt (2)
Constant	4.625*** (0.793)	2.972*** (0.193)	20.240*** (5.295)	15.660*** (1.463)
ESG	0.002** (0.001)	0.003** (0.002)	-0.005 (0.007)	0.006 (0.006)
ROA	0.049*** (0.004)	0.090*** (0.009)	0.0318 (0.023)	0.044** (0.019)
Assets	-0.218*** (0.050)	-0.124*** (0.015)	-0.692** (0.335)	-0.486*** (0.074)
Sales	0.068* (0.038)	0.065 (0.050)	-0.416 (0.285)	-0.744 (0.528)
Cash	-0.005 (0.004)	-0.029*** (0.006)	-0.064** (0.025)	-0.083*** (0.028)
Leverage	0.208 (0.210)	-0.430* (0.220)	-10.260*** (1.342)	-6.924*** (1.340)
Shares	0.001 (0.001)	0.002* (0.001)	0.009 (0.009)	0.007 (0.008)
Company	X		X	
Country		X		X
Year	X	X	X	X
Observations	5 809	5 809	5 719	5 719
R-squared	0.290	0.507	0.152	0.185

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

In the literature and previous studies, better ESG performance is often linked to lower risks through, for example, regulation. The coefficient in cost of debt (1) model is -0.005. As the coefficient is negative, it means a decreasing effect in cost of debt as the ESG score increases, which is the assumption, but the coefficient is not statistically significant. In cost of debt (2), the

coefficient is positive (0.006), and it is neither significant at any significance level. The regression model (3) shows no evidence that the ESG score impacts the cost of debt which is against the hypothesis of ESG performance lowering the cost of debt.

5.1.2. Results observing each year

Several different factors can influence how ESG affects the financial performance of companies, for example, stimulus packages or changes in law or regulations. As mentioned in the theoretical framework section, according to PRI (2021), the assets under management and signatories of responsibility principles have been growing, which indicates growth in the ESG awareness and popularity of ESG investing. This subsection focuses on if ESG scores have had a different impact on the financial performance in different years and if the possible impact has changed as a function of time.

The impact of ESG score on performance during years is tested using regressions (4), (5), and (6). The models include an interaction term that shows the significances and coefficients of ESG score each year. The interaction term coefficients cannot be interpreted the same way as in regressions (1), (2), and (3), used in the previous subsection.

Appendix 2 shows the full regression model (4) results on profitability through ROE and ROA. The appendix shows the coefficients for every variable, including the interaction terms. In the results, the coefficient for ESG score is the effect during the reference year. The reference year is 2002. The sum of the coefficient of a specific interaction term and the reference year results in marginal effect. Marginal effects are the coefficients of interest when interpreting the effect of ESG on each year, and table 11 shows the marginal effects. The coefficient of ESG score for ROE (3) model is -0.0170 and for ROE (4) model 0.0126. These coefficients are the effect of ESG on ROE during the reference year. For example, in appendix 2 in the first ROE model for 2006, the interaction term coefficient is 0.101. The sum of the interaction term coefficient (0.101) and reference year coefficient (-0.0170) results in the marginal effect of 0.084.

In general, the marginal effects in ROE models are more negative after 2011 than before 2012. Exceptions are years 2018 and 2014, which show higher coefficients compared to other effects during 2012-2019. When capturing country effects in ROE (4) model, the marginal effects are more often positive and relatively higher when compared to ROE (3) model. However, in both ROE models, the marginal effects are not statistically significant in any of the years.

Table 11. Marginal effects of ESG on profitability during years

	ROE (3)	ROE (4)	ROA (3)	ROA (4)
ESG (2002)	-0.0170	0.0126	0.0015	0.0253
2003	0.0625	0.1256	0.0254	0.0663*
2004	-0.0230	0.0966	0.0030	0.0567
2005	0.0745	0.1566	0.0217	0.0636
2006	0.0840	0.1646	0.0147	0.0603
2007	-0.0049	0.0479	0.0172	0.0610
2008	-0.0075	0.0574	0.0140	0.0705
2009	0.0345	0.0904	0.0084	0.0642
2010	0.0880	0.1396	0.0168	0.0667
2011	0.0481	0.0890	0.0201	0.0712
2012	-0.0213	0.0145	-0.0083	0.0453
2013	-0.0441	-0.0406	-0.0223	0.0089
2014	0.0581	0.0809	-0.0006	0.0480
2015	-0.0168	0.0319	-0.0187	0.0277
2016	-0.0660	-0.0059	-0.0264	0.0417
2017	-0.0002	0.0629	-0.0192	0.0400
2018	0.0567	0.1406	-0.0082	0.0554
2019	-0.0274	0.0499	-0.0342	0.0215

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$, (3) models capture company & year effects, (4) models capture country & year effects.

To compare, the ROA models show a similar pattern. In both ROA models, the coefficients are lower during 2012-2019 than before 2012. In addition, in the ROA (4) model, the coefficients are positive and often higher than in ROA (3). However, none of the coefficients of profitability models are statistically significant except in ROA (4) model in 2003 at 0.1 level. There is no evidence that the impact has been more significant or growing as a function of time. The results suggest that the impact of ESG on profitability is not dependent on the year.

Appendix 3 shows the full results of regression models (5) and (6), and the marginal effects of the models are in table 12. When observing Tobin's Q (3), the results show significant coefficients between 2013 and 2018 at either 0.05 or 0.1 levels. None of the effects are significant at the 0.01 level. A similar pattern is in Tobin's Q (4), but the coefficients are significant at the 0.1 level. Contradict result is that the statistically significant coefficients are often negative in Tobin's Q (3). In Tobin's Q (4), the coefficients are positive but relatively lower than before 2013. In general, after 2012, the effects on valuation have been more negative or lower than the effects before the year 2013. The results suggest that in 2013-2018 there has been a connection between valuation and ESG performance that depends on the year, but the impact has been stable and minor.

Table 12. Marginal effect of ESG to Tobin's Q and cost of debt during years

	Tobin's Q (3)	Tobin's Q (4)	Cost of debt (3)	Cost of debt (4)
ESG (2002)	0,0072	0,0085	-0,0293	-0,0089
2003	0,0051	0,0091	-0,0167	-0,0105
2004	0,0045	0,0110	-0,0095	0,0151
2005	0,0031	0,0061	-0,0026	0,0007
2006	0,0019	0,0053	0,0049	0,0075
2007	0,0013	0,0025	-0,0126	-0,0090
2008	0,0055	0,0050	0,0102*	0,0141**
2009	0,0040	0,0049	-0,0047	0,0071
2010	0,0017	0,0027	0,0050	0,0123
2011	0,0020	0,0035	-0,0087	0,0009
2012	0,0013	0,0048	0,0008	0,0112
2013	-0,0024**	0,0003*	-0,0321	-0,0235
2014	-0,0018**	0,0009*	-0,0077	0,0090
2015	-0,0028**	0,0002*	-0,0014	0,0106
2016	-0,0011*	0,0026	0,0030	0,0212**
2017	-0,0037**	0,0007	-0,0067	0,0221**
2018	-0,0015*	0,0011*	-0,0148	0,0042
2019	-0,0020	0,0030	-0,0140	0,0113

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$, (3) models capture company & year effects, (4) models capture country & year effects. The colors are switched in cost of debt models as negative coefficient means positive impact.

The marginal effects are more often negative in the cost of debt (3) model, meaning cost of debt improves as ESG score increases. When capturing country effects, the coefficients are usually

higher. The year 2008 shows a significant impact in both cost of debt models. Perhaps the ESG performance impacts the cost of debt in 2008 as 2008 was during the financial crisis and impacted many companies financially. The marginal effects are 0.0102* and 0.0141** correspondingly. However, the coefficients are contradictory as they are positive. In cost of debt (4), 2016 and 2017 show a significant impact at 0.05 level, and the coefficients are positive (0.0212** & 0.0221**).

There is no clear pattern on the cost of debt models. It cannot be concluded that companies have received better financing as a function of time through ESG performance or that the impact of CSR depends on the year, which is not aligning with the hypothesis. The results of other key figures in this subsection do not align with the hypothesis either.

5.2. Regression results of individual scores

This subsection focuses on the individual scores E, S, and G using regressions (7), (8), and (9). The results show the impacts of individual scores and which score has had the most impact. The coefficients of individual scores are compared and discussed. First, the impact on profitability is observed, and the results are in table 13. Environmental score shows similar results as combined ESG score. All the coefficients for environmental score in the profitability models except in ROA (6) are not statistically significant. In ROA (6), the coefficient is 0.016*** and significant at 0.01 level. Thus, environmental performance is linked to higher profitability through ROA.

Social score shows a positive correlation in all of the models. However, only when country effects are controlled is the relation statistically significant. In ROE (6), the relation is significant at 0.01 level (0.0841***) and in ROA (6) at 0.05 level (0.035**). Moreover, the coefficient for the social score in ROE (6) model is also the highest out of all the individual scores in the profitability models.

Governance score shows mixed results as in ROE (5), ROE (6), and ROA (5), the coefficients are negative. The coefficients correspondingly are -0.020, -0.007, and -0.009*. ROA (6) shows a positive coefficient for governance (0.001). None of the coefficients are statistically significant except in ROA (5) at a 0.1 significance level (-0.009*). In conclusion, there is no link between

governance score and ROE, but the result suggests a slightly negative link between governance and profitability through ROA. This is against the hypothesis that the individual pillar scores positively impact CSR performance.

Table 13. Individual ESG scores on profitability

	ROE (5)	ROE (6)	ROA (5)	ROA (6)
Constant	85.600*** (19.800)	38.990*** (3.102)	37.010*** (4.707)	30.470*** (1.834)
Environmental	0.035 (0.023)	-0.010 (0.018)	0.010 (0.006)	0.016*** (0.004)
Social	0.011 (0.028)	0.0841*** (0.025)	0.008 (0.008)	0.035** (0.012)
Governance	-0.020 (0.019)	-0.007 (0.0306)	-0.009* (0.005)	0.001 (0.007)
Assets	-4.499*** (1.261)	-2.037*** (0.310)	-1.808*** (0.297)	-1.669*** (0.145)
Sales	9.659*** (1.866)	8.860*** (1.274)	2.770*** (0.494)	2.993*** (0.348)
Cash	0.586*** (0.193)	0.378* (0.202)	0.180*** (0.050)	0.137** (0.051)
Leverage	-7.374 (5.795)	0.973 (2.141)	-9.318*** (1.658)	-3.484*** (0.733)
Shares	-0.084*** (0.027)	0.006 (0.022)	-0.026*** (0.009)	0.009 (0.006)
Company	X		X	
Country		X		X
Year	X	X	X	X
Observations	5 821	5 821	5 819	5 819
R-squared	0.076	0.078	0.126	0.254

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 14 shows the regression of individual scores on valuation and cost of debt. Tobin's Q (5) model shows a slightly positive correlation (0.001*) when observing environmental score. This coefficient is significant at 0.1 significance level. However, there is no connection between valuation and environmental score when controlling for country effects. Thus, a company focusing on environmental performance can have a slightly positive impact on its valuation. When it comes to cost of debt, the result suggests a negative coefficient (-0.005) for environmental performance in cost of debt (5) model and a positive (0.004) in cost of debt (6) model. However, neither of

these coefficients is statistically significant. In other words, there is no connection between the cost of debt and environmental performance.

Table 14. Individual ESG scores on valuation and cost of debt

	Tobin's Q (5)	Tobin's Q (6)	Cost of debt (5)	Cost of debt (6)
Constant	4.686*** (0.800)	2.914*** (0.193)	20.100*** (5.315)	15.770*** (1.502)
Environmental	0.001* (0.001)	-0.002 (0.001)	-0.005 (0.005)	0.004 (0.004)
Social	0.001* (0.001)	0.004* (0.002)	0.002 (0.005)	0.002 (0.005)
Governance	-0.001 (0.001)	0.002* (0.001)	-0.003 (0.004)	0.001 (0.003)
ROA	0.049*** (0.004)	0.090*** (0.009)	0.032 (0.023)	0.043** (0.019)
Assets	-0.220*** (0.051)	-0.123*** (0.014)	-0.681** (0.336)	-0.494*** (0.078)
Sales	0.070* (0.038)	0.053 (0.053)	-0.425 (0.285)	-0.728 (0.532)
Cash	-0.005 (0.004)	-0.028*** (0.006)	-0.063** (0.025)	-0.083*** (0.028)
Leverage	0.199 (0.210)	-0.412* (0.213)	-10.300*** (1.342)	-6.956*** (1.353)
Shares	0.0004 (0.0011)	0.003** (0.001)	0.009 (0.009)	0.007 (0.008)
Company	X		X	
Country		X		X
Year	X	X	X	X
Observations	5 809	5 809	5 719	5 719
R-squared	0.292	0.510	0.153	0.185

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

The coefficient of the social pillar score is positive in both Tobin's Q models and statistically significant at 0.1 level. Thus, both models suggest an increasing effect on valuation through social performance. The coefficient for social performance in Tobin's Q (6) is the highest in the valuation models (0.004*). Similarly, as in the profitability models, the social score has had the most positive and significant impact on valuation models out of the pillar scores. This is a surprising result as,

based on earlier studies, governance and environmental factors have been more substantial. On the other hand, the social score has no impact on the cost of debt.

When observing valuation, the coefficient of governance score is negative when company effects are controlled (-0.001). When country effects are captured, the coefficient is positive (0.002*). In cost of debt models, the coefficients are -0.003 and 0.001 correspondingly. However, none of the coefficients of governance pillar score in table 14 is statistically significant except in Tobin's Q (6) model at 0.1 significance level (0.002*). In conclusion, governance performance has no impact on the cost of debt, but it can slightly increase valuation.

5.3. Regression results of high and low ESG performance companies

This subsection focuses on the companies with high and low ESG performance. The results show how high ESG performance companies have performed financially against others and how low ESG performance companies have performed against others. The results of high and low performance companies are also compared. The results of high and low ESG performance models on profitability are presented in table 15.

When observing the correlation of high ESG performance companies and profitability through ROE, both models show a significant correlation at a 0.01 significance level. In high (1) model observing ROE, the coefficient is 0.018***. The coefficient indicates that for every 1 unit increase in ROE, the log odds of a company being in the top ESG performance group increases by 0.018. Changing to country effects, ROE has a little lower coefficient of 0.0170***. Both models indicate that a high ESG performance is linked to better ROE.

In ROE low (1) and (2) models, the coefficients are smaller or negative compared to corresponding high ESG performance models. The low models generate coefficients of 0.0004 in the first model and -0.003 in the latter. However, these coefficients are not statistically significant. Thus, there is no connection between low ESG performance and profitability through ROE.

ROA models show somewhat similar results as ROE models. In both high ESG performance models, the coefficients are statistically significant at 0.01 level, and both coefficients are positive (0.077*** and 0.126*** correspondingly). The coefficient is higher when country effects are controlled. Furthermore, a high ESG performance is linked to better performance in terms of ROA.

Table 15. High and low ESG performance on profitability

	High (1)	Low (1)	High (2)	Low (2)	High (3)	Low (3)	High (4)	Low (4)
Constant	-24.87*** (2.439)	15.86*** (3.027)	-10.13*** (1.008)	9.332*** (1.387)	-26.45*** (2.602)	15.89*** (2.983)	-13.89*** (1.575)	10.22*** (1.549)
ROE	0.018*** (0.006)	0.0004 (0.007)	0.017*** (0.003)	-0.003 (0.004)				
ROA					0.077*** (0.028)	-0.011 (0.022)	0.126*** (0.021)	-0.033* (0.017)
Assets	1.296*** (0.136)	-1.092*** (0.194)	0.515*** (0.038)	-0.691*** (0.075)	1.378*** (0.142)	-1.083*** (0.189)	0.706*** (0.068)	-0.729*** (0.08)
Sales	0.871** (0.361)	0.530 (0.422)	0.317 (0.221)	0.685*** (0.251)	0.837** (0.363)	0.568 (0.407)	0.18 (0.242)	0.696** (0.328)
Cash	-0.042 (0.073)	-0.094 (0.058)	-0.070 (0.055)	0.021 (0.035)	-0.059 (0.08)	-0.091 (0.058)	-0.085 (0.063)	0.025 (0.033)
Leverage	-1.783 (1.299)	-1.098 (1.027)	-0.164 (0.823)	-0.065 (0.456)	-1.455 (1.249)	-1.382 (1.014)	0.002 (0.777)	-0.539 (0.549)
Shares	-0.037*** (0.011)	0.015** (0.007)	-0.027*** (0.01)	0.016*** (0.003)	-0.037*** (0.012)	0.016** (0.007)	-0.027*** (0.01)	0.016*** (0.003)
Company	X		X		X		X	
Country		X		X		X		X
Year	X	X	X	X	X	X	X	X
Observations	5 315	5 821	5 315	5 821	5 311	5 819	5 311	5 819

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

In low (3) and (4) models observing ROA, the coefficients are negative (-0.011 and -0.033*). In the latter model, the coefficient for ROA is also statistically significant at a 0.1 level, but in the low (3) model, it is not significant at any level. In conclusion, there is a weak connection between low ESG performance and lower financial performance through ROA.

Table 16 shows the results of valuation and cost of debt models. Both high (5) and low (5) models where company effects are captured show a significant coefficient at 0.05 level for Tobin's Q. The coefficient in the high (5) model (0.439**) is approximately as positive as the coefficient is negative in the low (5) model (-0.434**). These models suggest that higher ESG performance is linked to higher valuations and lower ESG performance to lower valuations. In addition, a good ESG performance is approximately as rewarded by investors as low ESG performance is punished.

Table 16. High and low ESG performance on Tobin's Q and cost of debt

	High (5)	Low (5)	High (6)	Low (6)	High (7)	Low (7)	High (8)	Low (8)
Constant	-28.57*** (3.076)	17.74*** (2.908)	-14.30*** (1.741)	12.71*** (1.943)	-24.96*** (2.665)	16.66*** (2.635)	-13.86*** (1.504)	10.37*** (1.447)
Tobin's Q	0.439** (0.213)	-0.434** (0.208)	0.175* (0.097)	-0.584*** (0.107)				
Cost of Debt					-0.112** (0.046)	0.009 (0.026)	0.012 (0.028)	-0.001 (0.012)
ROA	0.06** (0.029)	0.006 (0.023)	0.109*** (0.018)	0.014 (0.017)	0.078*** (0.029)	-0.014 (0.02)	0.121*** (0.021)	-0.033* (0.018)
Assets	1.462*** (0.16)	-1.161*** (0.182)	0.72*** (0.073)	-0.847*** (0.1)	1.327*** (0.145)	-1.140*** (0.168)	0.706*** (0.066)	-0.738*** (0.077)
Sales	0.837** (0.363)	0.589 (0.401)	0.19 (0.246)	0.738** (0.311)	0.8** (0.371)	0.546 (0.420)	0.184 (0.242)	0.765** (0.35)
Cash	-0.052 (0.077)	-0.091 (0.057)	-0.079 (0.061)	0.006 (0.03)	-0.06 (0.08)	-0.094 (0.062)	-0.08 (0.063)	0.027 (0.035)
Leverage	-1.359 (1.233)	-1.624 (1.047)	0.036 (0.772)	-0.979* (0.529)	-2.465* (1.263)	-1.327 (1.13)	0.136 (0.671)	-0.646 (0.564)
Shares	-0.037*** (0.012)	0.016** (0.007)	-0.028*** (0.01)	0.018*** (0.003)	-0.037*** (0.012)	0.017** (0.007)	-0.029*** (0.01)	0.017*** (0.003)
Company	X		X		X		X	
Country		X		X		X		X
Year	X	X	X	X	X	X	X	X
Observations	5 302	5 809	5 302	5 809	5 219	5 719	5 219	5 719

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

When capturing country effects, the coefficient for Tobin's Q in the high (6) model is positive (0.175*) and significant at 0.1 level but not as positive or significant as in the high (5) model (0.439**). On the other hand, low (6) model has a more negative coefficient (-0.548***) than in the low (5) model (-0.434**). In addition, the coefficient in the low (6) model is also statistically significant at 0.01 level. To conclude, Tobin's Q models suggest a strong link between ESG performance and valuation. Lower ESG performance companies are punished with worse valuations than high ESG performance companies are rewarded.

There is no significant coefficient (0.009) in the low (7) model for cost of debt. However, in the high (7) model, the results suggest a negative link (-0.112**) between cost of debt and high ESG performance that is also significant at 0.05 level. Therefore, higher ESG performance is linked to lower interest. The coefficients in the high (8) and low (8) models, where country random effects are captured, are 0.012 and -0.001. These coefficients are not statistically significant at any level, meaning, no connection between cost of debt and ESG performance. In conclusion, according to these models, high ESG performance companies can have lower interest, but there is no link between low ESG performance and the cost of debt.

6. Conclusions

ESG, as a topic, has gained much attention lately, mainly because environmental and governance issues raised and still raise much discussion. It is widely discussed how corporate social responsibility will affect companies in the future and to what extent. There have been published a number of studies about the relation between corporate social responsibility and corporate financial performance. The purpose of this thesis was to provide more insights and findings to the discussion of whether ESG performance influences the financial performance of companies, or more specifically, the financial performance of European companies in the STOXX 600 index.

Three research questions were conducted to reach the purpose of this thesis. In addition, hypotheses were also conducted to the research questions based on the earlier studies and literature. The conclusions to the hypotheses are in appendix 4. This section summarizes the results and answers the research questions.

- 1) *How does ESG score affect the performance, and has the possible impact changed over time?*

Earlier studies have found mainly positive results on the relation between profitability and sustainability, but there are some contradictory results. In this paper, no correlation is found between ESG score and ROE when observing the whole time. However, when country effects are captured, there is a positive link between ROA and ESG performance. Furthermore, there is a positive correlation between ESG score and valuation, but there is no evidence that ESG performance impacts the cost of debt when observing the whole time.

When observing the effect on profitability each year, there is no connection between ESG performance and financial performance. This result is against the hypothesis that the impact of ESG has risen over time. In addition, valuation shows slightly significant correlations, but there is no clear pattern. There is neither a pattern in the cost of debt models. In conclusion, when

observing interaction terms models, it cannot be concluded that the impact is dependent on the year or has changed during the years. The reason why only a few significant impacts are found might be because the influence of corporate responsibility is better to study on the long-term and not short-term or yearly-level in this case. As previous studies and literature, and other studies have indicated, the short-term value of CSR can be hard to determine or quantify.

2) How do individual scores E, S, and G affect the performance?

Environmental score positively impacts profitability through ROA when country effects are controlled, but there is no impact to ROE. Environmental and governance scores are usually the most discussed and researched. Notable is that the social pillar score shows the most substantial impact on profitability out of all the pillar scores. However, when it comes to the cost of debt, none of the pillar scores have a significant impact.

Even if the impact is only minor, every pillar score has a positive impact on valuation. Similarly, as to profitability, the social score has the highest impact on valuation out of the pillar scores. It is the most prominent individual pillar score in this research in terms of statistical significance and impact. Furthermore, governance has been the least significant and least positively affecting financial performance. On the contrary, governance slightly harms profitability through ROA. Bauer et al. (2004) have also found contradictory impacts in governance performance.

3) How have high and low ESG performance companies performed financially?

A company focusing on ESG issues impacts its profitability positively, and the impact is substantially higher to ROA than ROE. However, the connections between low ESG performance and differences in profitability are not as significant as the corresponding connections in the high ESG score models. The results suggest that low ESG performance is weakly connected only to lower ROA. The more robust connection to ROA also in the other models might be because ROA considers a company's debt.

There is a clear connection between different ESG performances and valuations. Investors are willing to pay a higher price for better ESG performance companies. Low ESG performance companies are punished more than the high ESG performance companies are rewarded in valuation. This paper supports the claim in the previous studies and literature that investors are heavily interested in the responsibility performance of companies.

Earlier studies and literature indicate that worse ESG performance can lead to higher risks. However, this paper suggests that low ESG performance companies are not punished with higher interest on debt. On the other hand, there is a link between a high ESG performance and a lower cost of financing, which is in line with the earlier studies. In summary, being in the top ESG performance group is rewarding in every key figure, but belonging to the worst performers influences only ROA and valuation negatively.

To conclude, the results of this thesis align with the results by Busch et al. (2015), who investigated more than 2000 empirical studies on the relation of CSR and CFP. The results in the studies were mainly non-negative or positive, and so are the results in this paper. The actual value of CSR can be hard to determine as CSR can be hard to quantify or measure and more research to dig further into the possibilities of CSR needs to be done. However, this study supports the view that companies focusing on CSR has financial benefits.

There are limitations and restrictions to this thesis. The results cannot be generalized to all companies over the world. For example, the data only includes companies from the STOXX 600 index. Results might differ on smaller companies or companies from another region. In addition, a large part of the companies in the data comes from the UK and France. Furthermore, the data was obtained from the Refinitiv Eikon database. The dataset might have some outliers or other errors, but the data is the best data available for this research.

Several ESG score agencies give ESG scores to companies. A topic idea for future research is to study the ESG scores of different agencies and their rating processes. For example, agencies

might give different weights on metrics that can lead to different scores. Another topic would be to research more into what kind of CSR influences the company positively. For example, what kind of CSR reporting is best, what guidelines to follow, or which sustainability issues to focus on.

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Appendices

Appendix 1. Stationarity tests

All tests include lag value of 1 and a time trend

Null hypothesis: All panels contain a unit root

ROE	ADF	P-value	PP	P-value
Inverse chi-squared, P	2337.86	0.00	2753.93	0.00
Inverse normal, Z	-17.11	0.00	-23.79	0.00
Inverse logit, L*	-23.99	0.00	-31.37	0.00
Modified inv. chi-squared, Pm	36.73	0.00	46.80	0.00

ROA	ADF	P-value	PP	P-value
Inverse chi-squared, P	2015.32	0,00	2507.34	0.00
Inverse normal, Z	-14.08	0,00	-22.45	0.00
Inverse logit, L*	-19.06	0,00	-28.05	0.00
Modified inv. chi-squared, Pm	28.76	0,00	40.68	0.00

Tobin's Q	ADF	P-value	PP	P-value
Inverse chi-squared, P	1532.27	0.00	1773.23	0.00
Inverse normal, Z	-6.98	0.00	-10.48	0.00
Inverse logit, L*	-10.09	0.00	-14.75	0.00
Modified inv. chi-squared, Pm	16.96	0.00	22.84	0.00

Cost of debt	ADF	P-value	PP	P-value
Inverse chi-squared, P	1973.48	0.00	2907.15	0.00
Inverse normal, Z	-13.51	0.00	-24.40	0.00
Inverse logit, L*	-18.60	0.00	-33.92	0.00
Modified inv. chi-squared, Pm	28.40	0.00	51.09	0.00

ESG	ADF	P-value	PP	P-value
Inverse chi-squared, P	1839.34	0.00	2171.65	0.00
Inverse normal, Z	-10.18	0.00	-14.49	0.00
Inverse logit, L*	-15.11	0.00	-20.94	0.00
Modified inv. chi-squared, Pm	24.30	0.00	32.40	0.00

Environmental pillar score	ADF	P-value	PP	P-value
Inverse chi-squared, P	2401.76	0.00	2259.68	0.00
Inverse normal, Z	-10.02	0.00	-11.48	0.00
Inverse logit, L*	-20.07	0.00	-19.96	0.00
Modified inv. chi-squared, Pm	38.01	0.00	34.55	0.00
Social pillar score	ADF	P-value	PP	P-value
Inverse chi-squared, P	2190.94	0.00	2134.17	0.00
Inverse normal, Z	-11.45	0.00	-14.41	0.00
Inverse logit, L*	-19.29	0.00	-20.80	0.00
Modified inv. chi-squared, Pm	32.88	0.00	31.49	0.00
Governance pillar score	ADF	P-value	PP	P-value
Inverse chi-squared, P	1730.93	0.00	2178.68	0.00
Inverse normal, Z	-11.45	0.00	-19.54	0.00
Inverse logit, L*	-14.37	0.00	-23.53	0.00
Modified inv. chi-squared, Pm	21.66	0.00	32.57	0.00
Assets	ADF	P-value	PP	P-value
Inverse chi-squared, P	2225.20	0.00	1294.76	0.00
Inverse normal, Z	-6.95	0.00	-1.78	0.04
Inverse logit, L*	-17.03	0.00	-4.57	0.00
Modified inv. chi-squared, Pm	33.71	0.00	11.03	0.00
Sales	ADF	P-value	PP	P-value
Inverse chi-squared, P	2953.73	0.00	4395.17	0.00
Inverse normal, Z	-28.66	0.00	-44.05	0.00
Inverse logit, L*	-35.82	0.00	-57.40	0.00
Modified inv. chi-squared, Pm	51.46	0.00	86.59	0.00
Cash	ADF	P-value	PP	P-value
Inverse chi-squared, P	3368.16	0.00	7383.95	0.00
Inverse normal, Z	-33.40	0.00	-67.19	0.00
Inverse logit, L*	-42.37	0.00	-98.95	0.00
Modified inv. chi-squared, Pm	61.68	0.00	159.66	0.00
Leverage	ADF	P-value	PP	P-value
Inverse chi-squared, P	1538.66	0.00	1319.79	0.00

Inverse normal, Z	-5.94	0.00	-4.15	0.00
Inverse logit, L*	-9.49	0.00	-6.54	0.00
Modified inv, chi-squared, Pm	17.46	0.00	11.96	0.00

Closely-held shares	ADF	P-value	PP	P-value
Inverse chi-squared, P	2697.85	0.00	3114.51	0.00
Inverse normal, Z	-11.69	0.00	-19.26	0.00
Inverse logit, L*	-25.78	0.00	-33.11	0.00
Modified inv, chi-squared, Pm	45.22	0.00	55.38	0.00

Appendix 2. Profitability interaction term models

Interaction term models	ROE (1)	ROE (2)	ROA (1)	ROA (1)
Intercept	87.91*** (20.43)	42.23*** (4.758)	38.83*** (4.845)	31.59*** (2.188)
ESG	-0.0170 (0.0929)	0.0126 (0.117)	0.00154 (0.0278)	0.0253 (0.0249)
Assets	-4.571*** (1.280)	-2.095*** (0.286)	-1.922*** (0.298)	-1.683*** (0.152)
Sales	9.557*** (1.867)	8.924*** (1.319)	2.761*** (0.490)	2.956*** (0.357)
Cash	0.597*** (0.195)	0.371* (0.209)	0.184*** (0.0504)	0.135** (0.0507)
Leverage	-7.186 (5.749)	0.937 (2.350)	-9.073*** (1.639)	-3.336*** (0.769)
Shares	-0.0810*** (0.0266)	0.00923 (0.0256)	-0.0252*** (0.00845)	0.0111 (0.00668)
2003.year#c.esg	0.0795 (0.0921)	0.113 (0.103)	0.0239 (0.0263)	0.0410* (0.0233)
2004.year#c.esg	-0.00601 (0.0915)	0.0840 (0.0972)	0.00143 (0.0270)	0.0314 (0.0315)
2005.year#c.esg	0.0915 (0.103)	0.144 (0.0986)	0.0202 (0.0286)	0.0383 (0.0290)
2006.year#c.esg	0.101 (0.102)	0.152 (0.106)	0.0132 (0.0295)	0.0350 (0.0284)
2007.year#c.esg	0.0121 (0.114)	0.0353 (0.117)	0.0157 (0.0295)	0.0357 (0.0291)
2008.year#c.esg	0.00948 (0.109)	0.0448 (0.137)	0.0125 (0.0312)	0.0452 (0.0267)

2009.year#c.esg	0.0515 (0.105)	0.0778 (0.117)	0.00684 (0.0311)	0.0389 (0.0295)
2010.year#c.esg	0.105 (0.101)	0.127 (0.107)	0.0153 (0.0310)	0.0414 (0.0249)
2011.year#c.esg	0.0651 (0.0996)	0.0764 (0.118)	0.0186 (0.0310)	0.0459 (0.0271)
2012.year#c.esg	-0.00427 (0.0997)	0.00187 (0.124)	-0.00986 (0.0313)	0.0200 (0.0301)
2013.year#c.esg	-0.0271 (0.101)	-0.0532 (0.117)	-0.0238 (0.0305)	-0.0164 (0.0266)
2014.year#c.esg	0.0751 (0.105)	0.0683 (0.107)	-0.00209 (0.0313)	0.0227 (0.0267)
2015.year#c.esg	0.000180 (0.0999)	0.0193 (0.102)	-0.0202 (0.0317)	0.00244 (0.0258)
2016.year#c.esg	-0.0490 (0.109)	-0.0185 (0.117)	-0.0279 (0.0321)	0.0164 (0.0219)
2017.year#c.esg	0.0168 (0.100)	0.0503 (0.0916)	-0.0207 (0.0318)	0.0147 (0.0250)
2018.year#c.esg	0.0737 (0.106)	0.128 (0.0887)	-0.00975 (0.0330)	0.0301 (0.0232)
2019.year#c.esg	-0.0104 (0.103)	0.0373 (0.0951)	-0.0357 (0.0328)	-0.00384 (0.0257)
Observations	5821	5821	5819	5819
R-squared	0.077	0.078	0.129	0.252

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$, (1) models control for company & year effects and (2) models control for country & year effects

Appendix 3. Valuation and cost of debt interaction term models

Interaction term models	Tobin's Q (1)	Tobin's Q (2)	Cost of debt (1)	Cost of debt (2)
Intercept	4.754*** (0.814)	2.765*** (0.237)	21.84*** (5.496)	16.29*** (1.410)
ESG	0.00722* (0.00379)	0.00850* (0.00455)	-0.0293 (0.0212)	-0.00886 (0.0132)
ROA	0.0487*** (0.00412)	0.0897*** (0.00910)	0.0308 (0.0226)	0.0435** (0.0196)
Assets	-0.241*** (0.0504)	-0.124*** (0.0153)	-0.729** (0.341)	-0.486*** (0.0774)
Sales	0.0675* (0.0380)	0.0626 (0.0496)	-0.433 (0.281)	-0.749 (0.528)
Cash	-0.00438	-0.0280***	-0.0649***	-0.0827**

	(0.00378)	(0.00648)	(0.0250)	(0.0283)
Leverage	0.247	-0.430*	-10.19***	-6.914***
	(0.202)	(0.220)	(1.322)	(1.340)
Shares	0.000567	0.00226*	0.00942	0.00714
	(0.00105)	(0.00106)	(0.00916)	(0.00752)
2003.year#c.esg	-0.00213	0.000631	0.0126	-0.00165
	(0.00297)	(0.00324)	(0.0175)	(0.0266)
2004.year#c.esg	-0.00270	0.00248	0.0198	0.0240
	(0.00355)	(0.00375)	(0.0186)	(0.0140)
2005.year#c.esg	-0.00408	-0.00241	0.0267	0.00953
	(0.00346)	(0.00452)	(0.0242)	(0.0169)
2006.year#c.esg	-0.00535	-0.00325	0.0342	0.0164
	(0.00357)	(0.00460)	(0.0231)	(0.0148)
2007.year#c.esg	-0.00591	-0.00601	0.0167	-0.000167
	(0.00389)	(0.00531)	(0.0259)	(0.0201)
2008.year#c.esg	-0.00170	-0.00352	0.0395*	0.0230**
	(0.00392)	(0.00473)	(0.0208)	(0.0106)
2009.year#c.esg	-0.00319	-0.00361	0.0246	0.0160
	(0.00400)	(0.00512)	(0.0220)	(0.0150)
2010.year#c.esg	-0.00550	-0.00578	0.0343	0.0212
	(0.00408)	(0.00459)	(0.0235)	(0.0134)
2011.year#c.esg	-0.00518	-0.00498	0.0206	0.00976
	(0.00403)	(0.00446)	(0.0213)	(0.0105)
2012.year#c.esg	-0.00595	-0.00366	0.0301	0.0201
	(0.00409)	(0.00449)	(0.0209)	(0.0127)
2013.year#c.esg	-0.00957**	-0.00822*	-0.00284	-0.0146
	(0.00439)	(0.00462)	(0.0242)	(0.0236)
2014.year#c.esg	-0.00903**	-0.00756*	0.0216	0.0179
	(0.00456)	(0.00359)	(0.0240)	(0.0185)
2015.year#c.esg	-0.0100**	-0.00827*	0.0279	0.0195
	(0.00468)	(0.00398)	(0.0211)	(0.0180)
2016.year#c.esg	-0.00828*	-0.00591	0.0323	0.0301**
	(0.00491)	(0.00401)	(0.0212)	(0.0134)
2017.year#c.esg	-0.0109**	-0.00784	0.0226	0.0310**
	(0.00552)	(0.00488)	(0.0215)	(0.0142)
2018.year#c.esg	-0.00874*	-0.00740*	0.0145	0.0131
	(0.00477)	(0.00421)	(0.0231)	(0.0143)
2019.year#c.esg	-0.00919	-0.00550	0.0153	0.0202
	(0.00563)	(0.00591)	(0.0246)	(0.0154)
Observations	5809	5809	5719	5719
R-squared	0.300	0.509	0.155	0.187

Robust standard errors in parentheses, *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$, (1) models control for company & year effects and (2) models control for country & year effects

Appendix 4. Hypotheses with conclusions

	Hypothesis	Conclusion
H1:	ROE and ESG score have a positive correlation	Rejected
H2:	ROA and ESG score have a positive correlation	Not rejected
H3:	Tobin's Q and ESG score have a positive correlation	Not rejected
H4:	Cost of debt and ESG score have an inverse correlation	Rejected
H5:	The impact of ESG score has increased during time	Rejected
H6:	Individual pillar scores are positively linked to CFP	Rejected
H7:	High ESG score is linked to better performance	Not rejected
H8:	Low ESG score is linked to worse performance	Not rejected